TCEQ Revised Total Coliform Rule (RTCR) Level 1 Assessment Instructions

Disclaimer: The recommendations here are based on health-based regulatory requirements and best operational and management practices. Public water system (PWS) managers and operators must determine their own solutions. Reference to a technology, product, or service is for instructional purposes only and does not constitute a recommendation. If any unintended conflict with regulatory requirements is perceived herein, the rule language applies.

TCEQ provides free, on-site assistance with Level 1 Assessments through the Financial, Managerial, and Technical (FMT) Assistance program. To schedule, call the TCEQ's Water Supply Division (WSD) at 512-239-4691 and ask for the Level 1 Assessment Directed Assistance Module (DAM).

Contents

If you trigger a Level 1 Assessment, follow these instructions:

1. Read the Level 1 Assessment form and instructions

If you trigger a Level 1 Assessment because of total coliform positive (TC+) samples, follow these steps.

Note—the Level 1 Assessment form is on the web at:

www.tceq.texas.gov/drinkingwater/microbial/revised-total-coliform-rule

The TCEQ will also mail a PWS the form as soon as data is received that indicates a Level 1 Assessment is required. Do **not** wait for a letter to start work.

2. Gather the attachments you must submit with the form:

The items that must be attached to the Level 1 Assessment form are described in detail starting on page 9 of this manual.

Every system must submit 4 things:

☐ **Monitoring Plan**

Including a PWS Coliform Sample Siting Plan and a map of the distribution system with sites indicated. Please see the following link for a template of the Coliform Sample Siting Plan.

www.tceq.texas.gov/drinkingwater/microbial/revised-total-coliform-rule

☐ **Coliform Collection Standard Operating Procedure (SOP)**

The requirements for the SOP are described in detail under Question B.2. in this manual.

☐ **Disinfection residual results**

Data from the 'triggering month' plus results from the two months prior to the triggering month (daily or weekly data sheets, including results collected during coliform sampling).

☐ **Dead-end main (DEM) flushing records**

Data from the triggering month plus the two previous months.

Some systems must submit additional information:

☐ **Nitrification Action Plan—if you have chloramines**

Include the results of all monochloramine, free available ammonia, nitrite, and nitrate sampling from the triggering month and the two prior months.

☐ **Surface Water Monthly Operating Reports (SWMORs)**

If you treat surface water or groundwater under the influence of surface water (GUI) you must submit the SWMORs for the 'triggering month' plus reports from the 2 months prior to the 'triggering month.'

Level 1 Assessment Steps, Continued

2. Attachments, continued:

Note: You ***may*** need to gather additional forms, depending on your findings. For example:

☐ Plant operations manual	☐ Maintenance reports	☐ Pressure records
☐ Tank inspection records	☐ Photographs	☐ Weather records
☐ Calibration records	☐ Drought Contingency Plan	☐ Water loss audits
☐ Chemical usage reports	☐ Customer complaints	☐ Service Agreements
☐ Triggered Source Monitoring Plan	☐ Comprehensive Compliance Investigation reports	☐ Cross-Connection Control Program documents

3. Perform the Level 1 Assessment and complete the form.

▶ **Answer** all of the questions on the Level 1 Assessment form accurately and completely.

Answering these questions leads you through the process of performing the assessment.

▶ **Correct** any sanitary defects that you find and can fix within 30 days.

A sanitary defect is an actual or potential pathway for pathogens to enter drinking water. The RTCR requires PWSs to correct sanitary defects found during the assessment.

▶ **Report** what you fixed on the last page of the Level 1 Assessment form.

Complete the **Corrective Action Report and Plan (CARP)**. Describe what you fixed and plan to fix. If needed, request additional time to complete your planned fixes.

▶ **Plan** to fix any other sanitary defects you cannot fix within 30 days.

A large sanitary defect may need more time to fix.

4. If needed, talk to the TCEQ about additional time for corrections.

The RTCR allows the TCEQ to extend the time to fix a sanitary defect, after consultation with the state. Therefore, if you need that additional time to fix something, immediately consult with the TCEQ.

In order to request the extension, you will need to explain how you plan to complete the work. The Level 1 Assessment form includes a Financial Assurance Statement and Timeline (FAST) form to help you do that.

5. Submit the Level 1 Assessment form and attachments.

You must complete the Level 1 Assessment and submit the form within 30 days of the triggering event.

Keep a copy for your records and submit the form and attachments to:

Attn: WSD RTCR L1A, MC-155, TCEQ PO Box 13087 | Austin TX 78711-3087

(TCEQ recommends, but does not require, that you use certified mail.)

Level 1 Assessment—
Frequently Asked Questions

What is the purpose of the Level 1 Assessment?

The purpose of a Level 1 Assessment is to "find and fix" sanitary defects as required by the Revised Total Coliform Rule (RTCR).

The purpose of the Level 1 Assessment form and instructions are to guide PWSs through that process.

Another way to say this is that a PWS must identify and correct any conditions that may have led to the presence of total coliform, or that may lead to the presence of total coliform in the future.

What is a sanitary defect?

A sanitary defect is a potential pathway to pathogens.

Typical examples of sanitary defects include backflow, cross-connection, inadequate disinfection, and stagnant water.

What is a pathogen?

A pathogen is a microbe that can cause disease in humans.

Pathogens include bacteria, viruses, and protozoa (often in cyst form). For example, some *Escherichia coliform* (*E. coli*) bacteria are pathogens.

When is a Level 1 Assessment required?

A PWS must do a Level 1 Assessment if they hit a TC+ trigger.

NOTE: If any positive *E. coli* (EC+) occurs, the system will most likely have to do a Level 2 Assessment, which is more in depth.

The three Level 1 Assessment triggers are:

Type of system	Level 1 Assessment Trigger
1. All systems	**Fail to collect all required repeat samples** • After a routine bacteriological sample is found to be positive for total coliform (TC+)
2. Small PWS • Collects fewer than 40 samples per month • Population of 33,000 or less	**2 TC+** or more • Out of all required routine and repeat samples • No EC+.
3. Large PWS • Collects 40 or more samples per month • Population of 33,001 or more	**5% TC+** or more • Out of all required routine and repeat samples • No EC+

Who can perform a Level 1 Assessment?

The person who may perform the Level 1 Assessment depends on the type of system, as shown in the following table:

The person who can perform a Level 1 Assessment is:

Type of System	Who should perform Level 1 Assessment:
Community (C) and non-transient non-community (NTNC) PWSs	Licensed operator in charge of the system, for example: Chief Operator
Transient non-community (TNC) PWSs	Owner or operator in charge of the system, for example: Park Manager

Key points about who can do a Level 1 Assessment:

- The Assessor must be familiar with the PWS.
- The Assessor must be given access to all PWS representatives and paperwork.
- If the PWS has multiple licensed operators, the Level 1 Assessment should be performed by the 'operator-in-responsible-charge,' for example, the Utility Superintendent or Lead Operator.
- If a TNC PWS has multiple owners, operators, or managers, the person with the greatest responsibility and knowledge of the PWS activities should complete the form.

The person doing the assessment must ensure that the Level 1 Assessment Form is signed by the "responsible party" before it is sent to the TCEQ.

Who should sign the Level 1 Assessment form?

The PWS's 'responsible party' must sign the form.

This person is shown as the 'Administrative Contact' in Texas Drinking Water Watch:

dww2.tceq.texas.gov/DWW/

If a PWS won't be able to get the responsible party to sign—because of vacations or any reason, contact TCEQ immediately. Discuss who else would be appropriate to sign, and request approval for that. If you have any questions about who can sign the form, contact the TCEQ.

Is triggering a Level 1 Assessment a violation?

No.

The Level 1 Assessment replaces the 'Non-acute Violation' from the Total Coliform Rule (TCR).

Failure to complete the Level 1 Assessment Form within the 30 days is a violation. Failure to correct sanitary defects within 30 days is a violation—therefore, if you are going to have a problem with the timing, contact TCEQ immediately to request more time.

Is public notification required for a Level 1 Assessment?

No.

Since the Level 1 Assessment is not a violation, there is no requirement to notify your customers (if you complete the Level 1 assessment in 30 days).

However, failure to complete the Level 1 Assessment in 30 days is a violation requiring public notification. TCEQ has assistance for public notification on the web at:

www.tceq.texas.gov/drinkingwater/microbial/revised-total-coliform-rule

Is failure to perform a Level 1 Assessment a violation?

Yes.

If a PWS does not perform a triggered Level 1 Assessment and submit all required documentation to the TCEQ within 30 days, that PWS incurs a violation and must perform public notification.

Also, if a PWS performs the triggered Level 1 Assessments, finds sanitary defects, does not fix them within 30 days, and does not get approval for additional time to fix the sanitary defects—that is a violation requiring public notification.

What geographical area is included in the scope of a Level 1 Assessment?

It depends.

The size of the system, and the nature of the coliform detection will determine the area within the system that must be assessed. If coliform detections are widespread, a larger area may need assessment than if the coliform detections are tightly clustered.

Considerations include:

- **Pressure planes**—The initial assessment should focus within the pressure plane where the TC+ was detected.
- **Flow of water**—Water does not always move in one direction, so 'upstream' areas must be evaluated as well as 'downstream' areas.
- **Sampling routes**—for a larger system, sampling may be organized in 'routes.' It may be useful to focus on the route where the TC+ happened, for example when providing detailed maps.

In a **smaller system** with one pressure plane, it is likely that the entire system will be assessed.

Larger systems will need to determine whether the contamination is widespread or localized in the distribution system.

If an area smaller than the entire system is assessed, the justification must be provided with the Level 1 Assessment submittal.

If the TC+ samples that triggered the assessment were clustered in one part of the system, the Assessor can target the assessment to that specific section. It may not be practical or necessary to conduct an assessment of the entire distribution system.

What timeframe is included in a Level 1 Assessment?

At least the last two months.

Generally, the Level 1 Assessment must review conditions that occurred in the two months prior to the TC+ event, focusing particularly on the days when TC+ occurred.

However, if the Assessor is aware of circumstances that occurred longer than two months before the TC+ event that could have caused it, those should be investigated, reported on, and corrected.

Does the Level 1 Assessment include assessment of issues that are not in the TCEQ rules?

Yes.

The rules are minimum standards that do not cover every possible sanitary defect. The Level 1 Assessment considers any issue that could cause a potential pathway to pathogens, regardless of whether there is a related TCEQ rule or not.

The Level 1 Assessment is based on consideration of whether a PWS is using *best practices* to avoid fecal contamination. Best practices for PWSs are described in numerous places, including manuals produced by the American Water Works Association, National Rural Water Association, EPA, and others.

Will the TCEQ enforce on self-reported violations found in a Level 1 Assessment?

Possibly.

Most often, these self-reported violations may have already been identified through the TCEQ's periodic Comprehensive Compliance Investigations (CCIs) performed by regional investigators or through file review investigations performed by Water Supply Division staff. If so, enforcement actions may already have taken place, and there may be no need for any additional enforcement actions.

The purpose of the Level 1 Assessment is for the PWS to find and fix situations that could lead to fecal contamination of the drinking water, not specifically to identify violations. However, since the TCEQ rules for drinking water are intended to ensure that PWSs continuously protect the drinking water from contamination, many sanitary defects reflect a violation of TCEQ rules.

Every situation is different, and the circumstances leading to a Level 1 Assessment are unique. Therefore, the TCEQ's response will consider the specifics for each case.

The most important consideration in doing the Level 1 Assessment, and operating a PWS, is to protect public health against pathogens.

What reporting is required for a Level 1 Assessment?

The PWS must submit the completed Level 1 Assessment form, including the Corrective Action Report and Plan (CARP) describing how any sanitary defects were fixed, within 30 days of the triggering event.

What if I can't fix a sanitary defect in 30 days?

If you can't fix a sanitary defect in 30 days, you must request (and receive) an extension within 30 days.

The EPA and TCEQ recognize that there are some sanitary defects that may require engineered plans, with TCEQ approval, to correct. The rule allows a PWS to request extra time to complete the correction of a sanitary defect **with TCEQ approval**.

To request additional time, a PWS should submit a Financial Assurance Statement and Timeline (FAST) with documentation along with the Level 1 Assessment form, including:

- The general scope of the project;
- The expected cost;
- How the project will be paid for; and
- A timeline for specific actions, for example: writing SOPs, getting the money, getting engineering, approval, bidding, construction, training, and any other needed actions.

If engineering work is needed, include the name of engineer and letter or contract documenting that they are employed by the PWS for this work

The TCEQ will require follow-up progress reports periodically, for example—monthly.

If an extension is provided, the PWS must meet the TCEQ-approved corrective action timeline, or risk a violation.

Even if a PWS requests an extension, the Level 1 Assessment form with the extension request is due to the TCEQ in 30 days; failure to submit it is a violation.

Can an extension only be granted for engineering work?

The TCEQ can grant an extension to fix any substantiated sanitary defect if adequate substantiation is provided.

The CARP should describe the sanitary defect in detail and the FAST should explain the cost and timeline in detail.

For example, a PWS without a coliform sample SOP may need additional time to write and disseminate the SOP.

What is the difference between a Level 1 Assessment and a Comprehensive Compliance Investigation (CCI, also known as a Sanitary Survey)?

A **Level 1 Assessment** evaluates whether sanitary defects are present, and could have caused a TC+ event. It is limited to the time surrounding the TC+(s); it may be limited to a portion of the system that is related to the location where the TC+ was found. It does not consider chemical contamination, except if that was associated with pathogen contamination. A Level 1 Assessment is based on best practice, not the minimum standards given in TCEQ rules. A Level 1 Assessment is only required at PWSs that have TC+ triggers.

A **Comprehensive Compliance Investigation (CCI)** is required at all PWSs, regardless of coliform presence. It is very broad, and encompasses all aspects of the PWS. The CCI is used specifically to determine whether a PWS meets the TCEQ regulations in Title 30 Texas Administrative Code (30 TAC) Chapter 290 for eight elements:

1. Water source(s)—The CCI must evaluate all water supply sources to ensure proper source protection
2. Treatment facilities—The CCI must evaluate all treatment processes (e.g., chemical addition, filtration), facilities, components, and techniques
3. Distribution system—The CCI must evaluate the adequacy, reliability, and safety of the system for distributing water
4. Finished water storage—The CCI must evaluate the adequacy, reliability, and safety of finished water storage
5. Pumps and pump facilities—The CCI must evaluate proper operation and maintenance of all water system pumps and pumping facilities
6. Monitoring, reporting, and data verification—The CCI must review paperwork and plans to demonstrate compliance with all regulations

7. System management and operation—The CCI must review paperwork and plans to demonstrate that maintenance and operations can maintain compliance (e.g., engineered plans, Monitoring Plan and attachments, Cross-Connection Control Program documentation, emergency plan, and operations and maintenance manual.

8. Operator compliance—The CCI must review operator status to ensure the operator's certification is current and at the appropriate level

The TCEQ performs CCIs once every three years for community PWSs and once every five years for non-community PWSs. Reports are available through the Public Information Request process at:

www.tceq.texas.gov/agency/data/records-services/

Level 1 Assessment Attachments

Every PWS must attach documents 1 through 4:

All of these documents are required under the TCEQ regulations in 30 TAC Chapter 290.

1. Monitoring Plan

including a copy of the distribution system map showing coliform and residual sample sites.

Every PWS is required to have a **Monitoring Plan** (§290.121). The Monitoring Plan brings together all of the PWS's sampling requirements in one place.

An important part of the Monitoring Plan is the distribution map. In order to track trends and issues, you have to be able to get the broad view which only a map provides.

The map must show coliform and disinfection sample sites, major distribution lines/pipes, all storage, treatment plants, interconnections with other PWSs, pressure planes, the area served (for example, the city limits, district boundaries, or Certificate of Convenience and Necessity boundaries) and anything else that may relate to water age.

- A **small system** must submit the entire Monitoring Plan and the map of the entire system.
- A **large system** must submit the distribution system portion of the Monitoring Plan, a map of the system showing that sites are representative of the entire system, and a detail map (such as a route map) legibly showing the area where the TC+ event occurred.

(For the purposes of the Level 1 Assessment 'large' and 'small' are not specifically defined. The references herein to large and small are intended only as simplifying guidance. If you do not know how to characterize your PWS, consult with the TCEQ.)

If you find that your Monitoring Plan is outdated, you must fix it to show current procedures and sites. You should ensure that your selected sample sites represent the entire distribution system, that the site type is appropriate for what is being sampled, that the list is complete, and that the map has all sites shown clearly and correctly corresponding to the current list.

The TCEQ manual Regulatory Guidance (RG) 384: **"DEVELOPING A MONITORING PLAN FOR A PUBLIC WATER SYSTEM"** is available at:

www.tceq.texas.gov/publications/rg/rg-384.html

2. Coliform Sample Collection SOP (standard operating procedure).

Every PWS must follow an SOP to make sure that their samples are not contaminated.

Questions B.1. & B.2 on the Level 1 Assessment form ask for the details of the coliform collection SOP. The details of what must be included in the coliform collection SOP are described in these instructions under the discussion of question B.1 & B.2.

The TCEQ has guidance for coliform sample collection SOPs in Regulatory Guidance (RG) 421 "**COLIFORM SAMPLING FOR PUBLIC WATER SYSTEMS**" available at:

www.tceq.texas.gov/publications/rg/rg-421.html

3. Disinfection results (last 2 months and current month).

TC+ often occurs when disinfection is inadequate. In order to evaluate whether disinfection is a factor in triggering the Level 1 Assessment, it is necessary to look at the disinfectant residual results.

Results for the two months before the triggering event and all of the days in the month leading up to and including the date of that event must be submitted with the form.

For example, if you triggered a Level 1 Assessment on August 15, you would submit all the data from June and July, plus the data from August 1 through 15.

- PWSs serving more than 250 connections **or** a population of 750 people must submit results of daily disinfectant monitoring ("daily sheets").
- PWSs serving fewer than 250 connections **and** a population of less than 750 people must submit results of weekly disinfectant monitoring—or if they monitor more frequently, all results.

In addition to the daily/weekly disinfectant samples, all PWSs must measure disinfectant levels when collecting coliform samples. The results of these disinfectant levels must be reported.

Note: This is the same data that is reported on Disinfection Level Quarterly Operating Reports (DLQORs). However, the DLQOR is a compliance summary. For the Level 1 Assessment the detailed information underlying the DLQOR must be submitted.

The TCEQ has guidance for disinfectant monitoring and reporting in RG 407: **"DISINFECTANT RESIDUAL REPORTING FOR PUBLIC WATER SYSTEMS"**:

www.tceq.texas.gov/publications/rg/rg-407.html

Looking at historical data may also help determine if the problem is episodic or continuous. Knowing that will help you determine the type of corrective action that is needed.

4. Dead-end main (DEM) flushing results (last 2 months and current month).

Every PWS is required to flush every dead-end main (DEM) at least monthly and keep the results. Flushing helps reduce water age: water age is a common cause of water quality degradation. Over time, the disinfectant residual decays, and bacteria can grow or regrow.

DEM flushing results from the two months previous to triggering the Level 1 Assessment should be submitted. Flushing results from the month of the triggering event must also be submitted.

If a PWS believes that they need not flush DEMs, a full description of the reason for that assumption must be included in the CARP. All PWSs have areas of lower quality water, often associated with hydraulic dead ends, or DEMs. The public health impact of not having a flushing program may be significant if it allows stagnation and regrowth of pathogenic bacteria (a sanitary defect).

The definition of a 'main' has no lower limit. Any pipe size may be a DEM. DEMs that are less than 2" in diameter that end in a service connection must be flushed, but are not required to have a flush valve for the purpose.

Some PWSs must also attach documents 5 and/or 6:

5. Nitrification Action Plan (NAP), for PWSs that have chloramines

If you do not use chloramines, check '**N/A.**'

A chloramine system must also submit the data used to determine compliance with the NAP. This includes monochloramine, free available ammonia, nitrite, and nitrate data for the last two months and the current month.

For example, if you triggered a Level 1 Assessment on August 15, you would submit all the data from June and July, plus the data from August 1 through 15.

All PWSs that use chloramines are required to use a Nitrification Action Plan (NAP) to prevent and control nitrification [§290.46(z)] and collect NAP data [§290.110].

Nitrification occurs when nitrifying bacteria 'eat' ammonia and make nitrite and nitrate, causing rapid loss of disinfectant residual.

6. Surface Water Monthly Operating Reports (SWMORs)

if the PWS is required to submit SWMORs

If you are not required to submit SWMORs, check **'N/A.'**

All PWSs that operate a surface water treatment plant (SWTP) or treat groundwater under the direct influence of surface water (GUI) are required to submit SWMORs every month. The SWMOR documents the SWTP's success in removing and inactivating microbes.

A PWS that operates a SWTP must submit a copy of their SWMOR for the two months before the month the trigger happened. Also, all of the daily data collected up to and including the trigger date muse be submitted with the Level 1 Assessment form.

Level 1 Assessment Instructions

Level 1 Assessment Process

The Level 1 Assessment form guides you through the process of doing a Level 1 Assessment. The form and instructions are available on TCEQ's web site at:

www.tceq.texas.gov/drinkingwater/microbial/revised-total-coliform-rule

Start immediately!

The time is very short to get the assessment and form done—**only 30 days!**

First, review the form

Before starting the process, look through the form.

You will probably see that there are sections that do not apply to your system. You can check those as "N/A" then go back and consider the other sections that do apply to you.

Gather any missing information

As you review the form for the first time, you may think of other documentation you need, or other people you need to ask questions. Gather that data, contact those people, then start on the form.

Use these instructions

If you get confused about a question—check the instructions. If you still are confused, use the assistance sources listed in the instructions. For more help, call the TCEQ.

Focus on the TC+ area

The questions ask about a range of topics, from programs to specific sites. If you can't figure out what the question is asking, think about how the issue might have impacted the specific location(s) where you got the TC+s.

- For a **small system**, it is likely that any contamination could affect the whole system.
- For a **larger system**, a known problem may or may not be something to investigate in detail depending how close it is to the TC+(s).

  For example, a known pressure problem may have happened, but if it was 20 miles from the TC+ site, it may not have been related to the TC+. You can use the Corrective Action Report and Plan (CARP) to explain that the pressure problem happened, but was far away from the TC+ site.

A known problem may or may not be something to investigate in detail. Prioritize the investigation of things most likely to have caused the TC+ or the failure to collect repeats.

Focus on the TC+ time frame

The Level 1 Assessment looks at the two months leading up to the TC+ event, with emphasis on the days that the event occurred. However, if a problem happened three months ago that was a concern, it may be included.

What if I know the cause of the TC+?

You may have a good idea of what caused the TC+. You still must go through and answer every question. The process may help you find other, unnoticed sanitary defects.

If it is easier for you—first draft a summary of the problem in the CARP, then go through and answer the individual questions.

What if I already answered that?

You may find that sections overlap.

For example, if a flood caused an interruption in treatment, this would come up in multiple sections of the form. You would say 'yes' to questions about weather impacts, and 'yes' to the question about a treatment interruption.

Possible answers

There are 4 possible answers to each question:

"Yes," "No," Not Applicable ("N/A"), and "Unknown."

There are no *'right or wrong'* answers. The 'right' answer is the one that you believe is most accurate and that is supported by the documentation.

"Unknown"

If you feel like something is 'Unknown,' consider whether there is someone you could ask. If there is, contact them. If you still cannot get the information, check 'Unknown.' All answers of 'Unknown" must be explained in the CARP.

"N/A"

In certain locations, the instructions say 'mark "N/A"—for example to indicate that you don't have facilities that the question asks about, like a surface treatment plant. Elsewhere, answers of "N/A" would be wrong, and would need to be explained in the CARP.

Falsification warning:

Be aware that falsifying information reported to the TCEQ is a state and federal offense subject to all possible prosecution such as license revocation and jail time.

Corrective Action Report and Plan (CARP)

The CARP must include a description of what you found, what you fixed, and what you plan to fix.

There is a small area provided on the last page of the Level 1 Assessment form, and an extra page provided. Make more copies of the extra CARP page if you need to explain multiple issues.

Before submitting the form, check your answers to make sure any unusual or concerning circumstances are explained in the CARP.

Financial Assurance Statement and Timeline (FAST)

If you need to request additional time to fix a sanitary defect, you must include a Financial Assurance Statement and Timeline (FAST). You must get TCEQ approval for the extra time before 30 days is up or risk violations.

A form for the FAST is provided with the Level 1 Assessment form.

Submit the form and attachments

Within 30 days of triggering the assessment you must mail the completed, signed form and attachments to:

Attn: WSD RTCR L1A, MC-155

TCEQ, PO Box 13087

Austin TX 78711-3087

If you use certified mail, the Post Office will give you documentation that the mail was sent. You can keep that documentation for your records. TCEQ recommends—but does not require—that you use a trackable method for mailing hardcopies.

The TCEQ does not accept fax or email submittals of the Level 1 Assessment Form and attachments at this time.

Keep copies for your records

You must retain a copy of the completed Level 1 Assessment Form and attachments for your records. Also, retain documentation of any consultation with the TCEQ in the form of letters, emails, or phone records.

If you use certified mail for your submittal, retain a copy of the certified mail receipt form.

Operators—Section A

Question:

This question asks if the PWS meets the TCEQ requirements for operators.

Purpose of section:

Distributing drinking water is a complex, important job, so operators need to be competent and have the necessary credentials and training. If operators are not familiar with the many potential ways pathogens can enter the distribution system, water quality can degrade and cause a public health risk.

Not having appropriately certified and trained operators is also a violation of the TCEQ regulations of §290.46(e).

Transient noncommunity (TNC) PWSs are not required to have licensed operators; however, they are still required to operate the PWS correctly.

Contract operators must be licensed appropriately. This includes contract operators that work for TNCs.

You can check to make sure you meet the requirements by looking at the rules in §290.46(e) and checking TCEQ's web site to make sure all licenses are current.

You can request information about operator licenses from your contractors, if applicable.

Larger systems must have more operators than small ones. The number of required operators is based on the source water type and population.

Assistance:

You can check the TCEQ's data for your system's source type and population on-line at Texas Drinking Water Watch:

dww2.tceq.texas.gov/DWW/

If the information on Drinking Water Watch is incorrect, you can contact the TCEQ's Water Supply Division to make corrections at 512-239-4691.

The list of currently licensed operators is available for reference on the TCEQ Occupational Licensing Section web site at:

www2.tceq.texas.gov/lic_dpa/index.cfm

The Occupational Licensing Section web site can help you learn about licensing requirements, find licensed water operators in your county, and learn about training. You can talk to the TCEQ's Occupational Licensing Section at 512-239-6133, or on the web at:

www.tceq.texas.gov/licensing

Corrective Action Report and Plan (CARP)

If there are any issues with operators, those should be described in the Corrective Action Report and Plan (CARP)

A.1. Does the PWS meet TCEQ requirements for operators?

Report **'Yes'** if you have all the required licensed operators for a community (**C**) or nontransient noncommunity (**NTNC**) PWS.

Report **'Yes'** if your PWS is a transient noncommunity (**TNC**) and either the manager or a licensed contractor collects samples, completes chain-of-custody documentation, and provides that to you. (Please note that the PWS retains responsibility and authority for operating the system, including retaining any required documentation.)

Report **'Yes'** if your PWS (of any type) hires a contractor to collect coliform samples and that contractor has a Water License of any level. You must be able to document that contract operators are licensed. If the PWS does not meet the appropriate requirements, check **'No.**'

A.1. Correction Options:

Hire the right level of licensed operator to be in charge of/responsible for the PWS. Find a licensed contractor if the current one is not licensed.

If operator-error contributed to the TC+, consider whether the root cause was lack of training or failure to apply concepts from training. Provide additional training if needed.

A.1. TCEQ Follow-Up:

Maintain records of who works for the PWS. Provide employee documentation to the TCEQ upon request.

Coliform and disinfection—Sections B, C, and D

Section B—Coliform Monitoring

Questions:

These questions are intended to walk you through the key requirements related to coliform sampling, and to make sure that you do not have any sampling practices that could lead to inaccurate sample results.

Purpose of questions:

Coliform sampling is the primary focus of the RTCR. Coliform presence is a potential indicator that water quality has degraded, or harmful contaminants may have entered the distribution system water. TC+ is an 'indicator' of potential pathogens.

The requirements for coliform sampling are in §290.109(c). If you are not certain of whether your sampling is correct refer to the TCEQ rules.

Assistance:

You can check to make sure you meet the requirements for coliform sampling by looking at the rules in §290.109. The TCEQ also has guidance for coliform sampling in RG 421 "**COLIFORM SAMPLING FOR PUBLIC WATER SYSTEMS**."

www.tceq.texas.gov/publications/rg/rg-421.html

CARP

If there are any issues with coliform sampling, those should be described in the CARP.

B.1. Were all samples collected according to a sample collection SOP?

Answer **'Yes'** if you have and use a SOP you follow when collecting coliform samples. Answer **'No'** if you do not.

Attach a copy of the existing SOP to the Level 1 Assessment form when you send it in.

B.1. Correction Options:

If you answered 'No' you must correct that situation.

Create an SOP that follows the requirements. Train everyone who collects coliform samples to use that SOP. If you use a contractor, make sure their SOP meets TCEQ requirements, and that their staff follow the SOP.

B.1. TCEQ Follow-Up:

TCEQ staff will the review the SOP when it is received.

Keep a copy of the SOP and ensure it is available for review during any future inspection.

B.2. Does the SOP include tap sterilization, flushing, aerator removal, sterile bottles?

In order to know that a sample result is accurate, you need to know that the sample was collected carefully. The SOP benefits the PWS by ensuring accurate data.

If you do not have a SOP, or if your SOP does not include all of the required elements, answer '**No**.' Answer **'Yes'** if your SOP ensures that you:

- Do not collect samples during or right before heavy flushing has been performed in the area you are taking the sample
    - Heavy flushing can stir up sediment that is not representative of distribution water.
- Do not collect samples when weather could contaminate the sample.
    - State what to do on windy or rainy days. For example, delay sample collection to the following day. Or, specify an alternate site for those conditions.
- Sample according to the schedule and sites in the Monitoring Plan
- Remove water hoses and any other appurtenances from the sampling tap or hose bibb before collecting the sample.
    - For example, if there is an aerator on the tap, remove it before collecting the sample to make sure that 'gunk' collected on the aerator does not cause a TC+ that is not representative of distribution water.
- Properly disinfect the sampling tap by swabbing or spraying with a chlorine solution prior to collecting the sample. If materials are all metal, flaming may be used.
- Flush the water from the sampling line before collecting the sample. Make sure that enough water is flushed to make sure the water is representative of distribution system lines/pipes and is not stagnant water in the sample line or premise plumbing.
    - Ensure that the flushing is short enough that it represents local water, not water from a long distance away from the sampling tap.
    - If you base the flush time on a change in temperature, do some training to make sure all sample collectors are capable of detecting small changes in water temperature, and document approximate flush times.
- Use sterile, appropriate bottles, provided by your accredited lab, to collect sample water.
    - Check the expiration date to make sure that the bottles are not old.
- Use approved methods for collecting disinfectant residual with each coliform sample.
    - Use appropriately calibrated instruments.
- Check the correct box for "Routine," "Repeat," "Construction," or "Special."
- Fill out chain-of-custody forms correctly. Route the sample correctly.

Attach a copy of the coliform collection sampling SOP to the submitted, completed Level 1 Assessment form when you send it in.

<u>B.2. Correction Options:</u>

If you answered 'No' you must correct that the situation by developing or revising an SOP that incorporates these best management practices for sample collection and preservation.

The SOP, at a minimum, should include the precautions for collecting samples found above and in TCEQ RG-421 under the title "Precautions to take when collecting compliance samples."

Provide the revised SOP to TCEQ.

B.2. TCEQ Follow-Up:

TCEQ staff will the review the documentation when it is received. Keep a copy of the SOP and ensure it is available for review during any future inspection.

B.3. Were all samples collected from locations identified in the Monitoring Plan?

Answer **'Yes'** if you sampled in accordance with your Monitoring Plan and coliform sample siting plan describing repeat locations. Answer **'No'** if sampling did not follow the Monitoring Plan.

The web site for the coliform sample siting plan is:

www.tceq.texas.gov/drinkingwater/microbial/revised-total-coliform-rule

Under the RTCR, distribution repeats are always collected at the same three sites, and those sites must be documented in your Monitoring Plan.

B.3. Correction Options:

You can't go back in time and collect samples. So your best correction option is to ensure that your Monitoring Plan is correct, up-to-date and representative of your entire distribution system, and counsel and train all operators who collect samples to follow the guidelines and procedures as established in the that Monitoring Plan.

B.3. TCEQ Follow-Up:

TCEQ will review the documentation when it is received. Keep a copy and ensure it is available for review during any future inspection.

B.4. Were all repeats collected, including raws at operational wells?

Answer **'Yes'** if you collected all required repeats. Answer **'No'** if you did not.

Under the RTCR, the required distribution repeats are always collected at the same three sites: (1) The original routine site, (2) a designated 'upstream' site, and (3) a designated 'downstream' site.

The RTCR does not 'track' coliform presence through the pipes like the TCR did. Under TCR, repeats were taken progressively farther away from the original TC+, forming a 'tree' of sample locations.

Additional coliform sampling may be useful for your investigation of the incident. If you take samples at different locations for investigation purposes, mark the bacteriological sample submission form "*Special*."

The **Ground Water Rule (GWR)** requires that every operational groundwater source feeding a distribution system be sampled for *E. coli* after any TC+ is found in distribution.

- Note that in some cases, you must collect five (5) sequential samples from each source. Call TCEQ at 512-239-4691 to check on this before collecting your raw repeats.
- You can either collect the five samples at intervals—for example every 15 minutes—or you can collect a single sample and pour it into 5 sample bottles while in the field. You may not collect a single sample and bring it back to the lab to split up because the samples must be field-preserved.

Note that the GWR includes requirements for wholesaler groundwater sources. Therefore, raw samples from any wells at wholesalers must also be collected within

24 hours of the wholesale connection collecting a TC+. Those results must be considered in this question.

- Purchasers should document that you notified the wholesaler of the need for samples in a timely manner. Keep copies of the wholesaler's response.
- Wholesalers should document that you provided the results of raw water coliform sampling in response to a TC+ in a downstream system within 24 hours.

B.4. Correction Options:

You can't go back in time and collect samples, so your best correction option is to establish a protocol that lessens the potential for failing to collect the required repeats or triggered source raw water samples. Your Monitoring Plan should be updated to include changes to the protocol. Submit the changes to the Monitoring Plan to the TCEQ for their review.

B.4. TCEQ Follow-Up:

TCEQ staff will review the documentation when it is received. Keep a copy and ensure it is available for review during any future inspection.

B.5. Were all sites where TC+ happened sanitary? Consider the condition, location, frequency of usage, and historical data..

Review your sample sites where TC+ occurred.

If all of your sites are sanitary, check **'Yes.'** Answer **'No'** if not.

Sanitary sites:

- Have clean, well-maintained taps and sample lines.
  - **Community:** Do not collect samples from plumbing inside of someone's home, for example: kitchen sink, bathroom faucet, etc.
  - **Noncommunity:** If it is necessary to select sample sites inside a building, select those least likely to be contaminated: for example, a sink outside of a bathroom is better than one inside a bathroom.
- Have sample taps that are free from excessive vegetation and are at least 18" above the surface of the ground.
- Are located where livestock do not graze, and dogs cannot pee on them.
- Are located in areas that do not harbor vermin.
- Are used frequently enough that stagnant water in premise plumbing will not impact sample results.

Do not collect samples at houses that are vacant or have been vacant for extended periods of time.

Photos

If you find an unsanitary condition, take 'before-and-after' photographs to document what you found and how you corrected it. For example, if you select a new site, take photos of the old site and the new site.

B.5. Correction Options:

If you answered 'No' you must correct that situation. Clean up the site or select new, sanitary sample sites to replace the unsanitary sites. Take photographs of the cleaned or new sites to document that change.

Review lab 'rejects.' Unsuitable samples that are rejected by the lab are caused by water issues. Frequent 'rejects' at a specific site may indicate unsanitary conditions. It is highly recommended that you investigate the reason for a sample that is too dirty to analyze.

If you changed sites, update your coliform sample sites in your Monitoring Plan. Submit an updated Coliform Sample Siting Plan. Additionally, you should train the operators collecting the samples on how to identify unsanitary conditions so that the problem does not happen again.

B.5. TCEQ Follow-Up:

TCEQ staff will review the Monitoring Plan when it is received. Keep a copy of the up-to-date Monitoring Plan and ensure it is available for review during any future inspection.

B.6. Was point-of-use treatment present upstream of a TC+ site?

Determine whether there are any softeners or other point-of-use treatment devices installed upstream of the sample tap(s) where you collect routine and repeat coliform samples.

If you do not know, either perform a Customer Service Inspection or contact the customer and ask. If a treatment device is present upstream of one of the TC+ sites, check **'Yes.'**

If you can confirm that there are no such devices located upstream of all of your sampling taps/locations, check **'No.'**

If none of the TC+ were collected from an active service connection, check **'N/A.'** For example, if all the TC+ samples were collected from dedicated sample stations.

B.6. Correction Options:

If you answered 'No' you must correct that situation.

Problems related to point-of-use devices that are installed upstream of coliform sample taps include:

- Stagnant water in softeners which can cause TC+.
- Point-of-use filters that are not replaced or routinely maintained can become super saturated with microbes and contaminants causing TC+.
- Point-of-use filters often remove disinfection residuals making the sample water collected downstream of them more susceptible to coliform contamination.

Select new, sanitary sample sites to replace the unsanitary sites. Update your coliform sample sites in your Monitoring Plan and submit the updated Coliform Sample Siting Plan to TCEQ.

B.6. TCEQ Follow-Up:

TCEQ staff will the review the Monitoring Plan when it is received. Keep a copy of the up-to-date Monitoring Plan indicating sample sites and ensure it is available for review during any future inspection.

B.7. Were any laboratory analytical issues found?

If no analytical issues were identified and documented, select **'No.'** If analytical issues were found, select **'Yes.'**

If you do not know, contact the lab and ask. If you need to, you can ask the lab to provide the "quality assurance and quality control" documentation for the samples.

B.7. Correction Options:

If you answered 'Yes' you must correct that the situation by either working out the issue with your current laboratory or getting a new lab. Be sure to update your Monitoring Plan with any changes to the lab. Inform the TCEQ of those changes.

To avoid lab issues, you should establish a protocol for taking split and blank samples and submitting them to multiple laboratories for analysis. This will assist you in determining whether there are any issues with the laboratory that you are currently using.

Review documentation for lab 'rejects.' Unsuitable samples that are rejected by the lab are caused by water issues—not lab issues. Some of the terms used for rejecting samples are "silty," "unsuitable for analysis," "too numerous to count," "too turbid for analysis," and "high growth." All of these situations mean the water is too dirty for the lab to use their method of analysis for drinking water samples. You are required to re-sample within 24 hours when a sample is rejected. It is highly recommended that you investigate the reason for a sample that is too dirty to analyze.

If the disinfectant residual in a coliform sample is zero, you should determine why that is the case.

B.7. TCEQ Follow-Up:

TCEQ staff will the review documentation when it is received. Keep a copy of the up-to-date Monitoring Plan with the Laboratory Approval Form, and any other correspondence related to analytical issues and ensure it is available for review during any future inspection.

Section C—Disinfectant Residual Monitoring

Questions:

These questions are intended to help you assess the adequacy of disinfection at the PWS.

Purpose:

Every PWS is required to maintain a disinfectant residual throughout the distribution system at all times. Disinfectant residuals protect against pathogens that may enter the distribution system through leaks, cross-connections, or backflow/backpressure events. Disinfectant residuals also protect against pathogens that may be harbored or spawned in biofilms found in pipe tuberculation.

Disinfectant residual monitoring issues may or may not also be violations of TCEQ regulations in §290.110.

You can check to make sure you meet the requirements for disinfection residuals by looking at the rules in §290.110.

Assistance:

TCEQ has assistance for disinfection on the web at:

www.tceq.state.tx.us/drinkingwater/disinfection

The TCEQ also has guidance for disinfectant sampling in RG 407.

www.tceq.texas.gov/publications/rg/rg-407.html

CARP

If there are any issues with disinfection, those should be described in the CARP.

C.1. Was all required disinfectant monitoring performed?

If you performed all of your daily/weekly disinfectant residual monitoring and also measured the disinfectant residual with every coliform sample, check **'Yes.'** If not, check **'No.'**

C.1. Correction Options:

If you answered 'No' to the above question you must correct the issue immediately by beginning to monitor the disinfectant residual at the proper intervals, and at locations that are representative of the entire distribution system. Additionally, ensure that the monitoring activity is properly rotated through samples sites, so as you are not tempted to favor good performing sample sites over the poor performing ones. Make revisions to your Monitoring Plan, adding any additional sample sites that were added or changes in sample rotation or protocol, and notify the TCEQ of the revisions.

C.1. TCEQ Follow-Up:

Failure to perform all required disinfectant residual monitoring is a monitoring violation, which may require public notification. The TCEQ will consult with you regarding this situation. Keep documentation of your communication with TCEQ for review during periodic compliance investigations, for example: e-mails and letters.

C.2. Were the results reported on the DLQOR or SWMOR?

If you sent TCEQ all of your required reports, check **'Yes.'** If not, check **'No.'**

Systems that redistribute purchased potable water and systems that use groundwater sources must report their distribution disinfectant residual data on Disinfectant Level Quarterly Operating Reports (DLQORs).

Systems that operate SWTPs (or GUI treatment) must submit distribution disinfectant residual information on page 1 of the SWMOR. If entry point data is reported on page 1 of the SWMOR; that is incorrect—the data from distribution must be reported.

C.2. Correction Options:

If you answered 'No' you will need to ensure that all required reports are submitted in future. Consider using certified mail so that if your submittal goes astray in the mail, you have proof that you mailed it on time.

The DLQOR form is available on the web. You can now submit it electronically

www.tceq.state.tx.us/drinkingwater/disinfection/dl_qor/dlqor_pdf.html

C.2. TCEQ Follow-Up:

Failure to submit all required reports is a reporting violation, which may require public notification. The TCEQ will consult with you regarding this situation. Keep documentation of your communication with TCEQ for review during future inspections, for example: emails and letters.

C.3. Were all distribution residual levels at or above the minimum?

Review your disinfectant residual monitoring results collected from the distribution system for the last two months through present.

This is the data that should be attached to your form; it was gathered in the first step. It should include all of the data for the two months before the triggering event, plus all of the data through the event.

- If free chlorine is used in distribution, check **'Yes'** if the residual never fell below **0.2 mg/L.**
- If total chlorine (monochloramine, chloramines) is the distribution disinfectant, check **'Yes'** if the residual never fell below **0.5 mg/L**.

If the distribution residual dropped below the required minimum, check **'No.'**

C.3. Correction Options:

If you answered 'No,' implement necessary treatment and operational adjustments to ensure that the disinfection residual in the distribution system remains greater than or equal to the regulatory minimums.

C.3. TCEQ Follow-Up:

Two consecutive months in which 5% or more residual samples are below the minimum is a treatment technique violation. The TCEQ will consult with you regarding this situation. Keep documentation of your communication with the TCEQ for review during future inspections, for example: e-mails and letters.

C.4. Was there any time when distribution residual dropped to zero?

Review your disinfectant residual monitoring results collected from the distribution system for the last two months through the present. If the residual never dropped to zero, check **'No.'** If the residual dropped to zero at any time, check **'Yes.'**

C.4. Correction Options:

If you answered 'Yes,' implement necessary treatment and operational adjustments to ensure that the disinfection residual in the distribution system remains greater than or equal to the regulatory minimums.

C.4. TCEQ Follow-Up:

Absence of disinfectant may be identified as an acute treatment technique violation and may require public notification—including the possibility of a boil water notice. The TCEQ will consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled. Keep documentation of your communication with TCEQ for review during future inspections, for example: e-mails and letters.

C.5. Are all analyzers calibrated and verified as required?

All instruments that are used to measure disinfectant residuals must be calibrated or verified every 90 days. If you do so, and keep records of it, check **'Yes.'**

If the instruments are not verified or calibrated, or if records are not maintained, check **'No.'**

The purpose of calibrating and verifying analytical instruments is to ensure that the results are accurate. The requirements for calibrating and verifying instruments are in 290.46(s).

C.5. Correction Options:

If you answered 'No,' start calibrating (and/or verifying the calibration of instruments) and keeping records.

C.5. TCEQ Follow-Up:

Failure to calibrate/verify instruments may be a violation of the TCEQ's rules in §290.46(s). Keep documentation of your communication with the TCEQ for review during future inspections, for example: calibration results and SOPs.

Section D—Nitrification (for PWSs that have chloramines)

Questions:

These questions are intended to help you assess whether nitrification occurred and whether your response was appropriate.

Purpose:

Systems that use chloramines for distribution system disinfection are at risk of nitrification. Nitrification is a natural microbial process that can cause a loss of disinfectant residual and formation of nitrite and nitrate, both of which can have very negative public health effects (they can cause blue-baby syndrome in infants). For those reasons, the TCEQ has adopted regulations to help PWSs that use chloramines to prevent, respond to, and mitigate nitrification when it happens.

Nitrification issues may or may not cause violations of TCEQ regulations.

You can check to make sure you meet the requirements for chloramine effectiveness and nitrification monitoring and Nitrification Action Plans in the rules in §290.110 and §290.46(z), respectively.

Assistance:

The TCEQ has guidance regarding nitrification on our website at:

www.tceq.texas.gov/drinkingwater/disinfection/nitrification.html

If any nitrification event occurred, you must describe it in the CARP section at the end of the Level 1 Assessment form.

CARP

If there are any issues with nitrification, those should be described in the CARP.

D.1. Did nitrification occur or has it recently occurred?

Review your data to determine if any indicators of nitrification confirmed its presence; for example, lower- than-normal ammonia, an increase or decrease in nitrite, an increase in nitrate, a pH drop, or any site-specific indicators you have identified in your NAP such as microbial testing.

When it comes to nitrification, one size does not fit all. Your systems goals, baselines, triggers, and actions will probably be different than those at other PWSs.

If you know that nitrification occurred, check **'Yes,'** if you do not know whether it occurred, check **'Unknown.**' If you are certain that nitrification did not occur, and you can document that, check **'No.'**

D.1. Correction Options:

If nitrification occurred, you will likely need to take corrective action.

Nitrification sometimes causes TC+ because it causes rapid decreases in disinfection residuals which produces a conducive environment for the growth and regrowth of bacteria and biofilms.

If you have not developed a Nitrification Action Plan (NAP), then do so, and submit to the TCEQ for their review. If you've already developed and are implementing a NAP, then you may need to revise the goals, baselines, and triggers, to facilitate the prevention of nitrification moving forward. Submit revisions to your NAP to the TCEQ for their review.

D.1. TCEQ Follow-Up:

Nitrification may lead to low residuals and TC+, which may cause violations. Provide data regarding the nitrification event to the TCEQ upon request and keep documentation for review during future inspections.

D.2. Does the PWS implement an adequate Nitrification Action Plan?

If you do not have a Nitrification Action Plan, check **'No.'** If you have a Nitrification Action Plan, but do not implement it, check **'No.'** If you use chloramines, but no nitrification occurred, check **'N/A.'**

If you successfully used your Nitrification Action Plan in response to the nitrification event, check **'Yes.'**

D.2. Correction Options:

Review both the Nitrification Action Plan and how it is used at your PWS. If either of these is not adequate, corrective action will be necessary. If you have not developed a Nitrification Action Plan, then do so and submit it to TCEQ as discussed above under question D.1.

Successful use of a Nitrification Action Plan requires coordination, cooperation, and communication between staff of different areas and their managers. These communication pathways are crucial in efforts to prevent nitrification from occurring or eliminating it once it has developed. Failure to document sampling and operational actions and to properly maintain the documents can prevent the system from implementing corrective actions ahead of the development of nitrification.

Nitrification is much harder to manage once it has started than it is to prevent. Developing a proactive model of preventing nitrification from developing through adjustments in treatment and operations is what the water system should strive to accomplish. If those communication pathways are not documented and maintained, critical decisions may not be made, and the plan may fail.

D.2. TCEQ Follow-Up:

Failure to have a Nitrification Action Plan is a violation of §290.46(z).

Failure to control nitrification by implementing a good prevention plan may result in nitrification causing low residuals and TC+ which may lead to violations. Be prepared to provide data to the TCEQ upon request; keep documentation for review during future inspections.

D.3. Was the PWS performing a temporary conversion to free chlorine during the time the TC+ was/were collected?

If you are performing a 'preventive' or 'corrective conversion' to free chlorine ('burn'), check **'Yes.'** If not, check **'No.'**

A conversion to free chlorine involves a great deal of work in the distribution system—turning and isolating valves, flushing hydrants, and monitoring water quality. In that process, changes in flow and pressure may stir up sediment resulting in TC+ samples resulting from significant changes in water quality.

D.3. Correction Options:

If you find an issue, review your procedures for free chlorine conversions to make sure that the process for switching to free chlorine, and then back to chloramines, is well documented and that staff follow the procedures.

You may want to avoid collecting coliform samples when the system is in the process of transitioning from free chlorine to chloramines and vice versa. Avoid collecting bacteriological samples in an area that you have recently flushed very heavy. Give the area some time to settle back down before collecting a sample there.

These strategies must be very well thought out and planned to ensure that all regulatory samples are collected, are on time, and are representative of your distribution.

D.3. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections. Always notify TCEQ at DBP@tceq.texas.gov before doing a temporary conversion to free chlorine.

Sources—Sections E, F, and G

Section E—Source—Wells

If you do not have any wells, check **'N/A'** and skip to the next section.

Systems should evaluate wells that provide water to the area where the TC+ occurred. In the absence of documentation establishing which wells serve that area, all wells should be evaluated.

Questions:

These questions are intended to help you assess your groundwater sources.

Texas has implemented rules regarding well siting and wellhead protection since 1937. The underlying principle is basic: just like good water can come out of a well, other stuff—bad stuff—might get in.

Groundwater source issues may or may not also be violations of TCEQ regulations in §290.41(c).

Assistance:

You can check to make sure you meet the requirements for groundwater sources by looking at the rules in §290.41.

CARP

If there are any issues with wells, those should be described in the CARP.

E.1.a. Does the PWS control and protect land around wells?

Review the system's well records to determine how the PWS complies with the requirements in §290.41 regarding well location. Answer the questions as accurately as possible.

Review the records of TCEQ Comprehensive Compliance Investigations to determine whether any historical issues have been identified by the TCEQ. This applies to all wells that could influence the area where TC+(s) occurred.

The absence of control of land around wells could be a sanitary defect, because someone could locate unsanitary activities or facilities near a drinking water well. The following three questions ask for additional detail on how the land nearby wells is protected and controlled.

TCEQ's rules require that the PWS have control of the land within 150' from a drinking water well [§290.41(c)(1)(F)]. However, if contamination 151' from the well is a risk, that should also be documented. The Level 1 Assessment is driven by public health impact, not solely regulatory compliance.

If the PWS has a strategy—such as one of those in questions E.1.b through d—answer **'Yes.'** If not, answer **'No.'** Any answer of **'N/A'** or **'Unknown'** should be explained in the CARP.

E.1.b. Does the PWS own all the land within 150 feet) of wells?

Owning the land close to a well is one way to protect against contamination.

If the PWS owns the land within 150' of wells—answer **'Yes.'** If not, answer **'No.'**

E.1.c. If not, does every other well have a Sanitary Control Easement?

A PWS that does not own the land around their wells must enter into a sanitary control easement (SCE) with landowners in a radius of 150' from the well, in order to protect against contamination.

If the PWS has SCEs to protect wells, answer **'Yes.'** If not, answer **'No.'**

E.1.d. If not, does every other well have an approved SCE exception?

A PWS that does not own the land around their wells, and cannot get SCEs with landowners in a radius of 150' from the well must perform site-specific actions to make sure that wells are not contaminated. This is accomplished by seeking and receiving a site-specific 'exception' to the TCEQ rules, and following any conditions noted in the exception-approval letter. Most exceptions require monthly raw water bacterial sampling, as one of the conditions.

If the PWS has exception(s), answer **'Yes.'** If not, answer **'No.'**

E.1.a, b, c, and d. Correction Options:

If you cannot document the ownership or SCE, corrective action may be needed.

If your documentation of wellhead protection is incomplete, you will need to take action to ensure that the well heads are protected.

If you are a municipal system, search your ordinances for established well protection measures and if you are a rural water system, search the county clerk's office for the county seat where your system is located.

Review your records to determine any existing violation documentation, such as an Agreed Order (AO), if the TCEQ already documented a violation. If an AO is present, follow the included Technical Requirements.

E.1.a, b, c, and d. TCEQ Follow-Up:

Failure to document the method used to protect and control the area around the well head may be a violation. The TCEQ will consult with you regarding this situation. An on-site investigation by the TCEQ may be scheduled.

Keep documentation of your communication with the TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

E.2.a. Are there known hazards close to a well? (For example, septic system, cattle, sewage treatment or storage, etc.)

One potential pathway for pathogens is nearby fecal matter or putrefaction. Consider whether there any known hazards close to a well. The closer a hazard is to a well, the greater the risk. The questions in E.2.b through f consider risks at various distances, and make note of specific TCEQ regulations for each distance. Hazards of concern would be any fecal sources, for example,

- Septic tanks or fields—especially older ones;
- Cattle—especially feeding operations, but also grazing;
- Sewage—storage facilities or treatment facilities;
- Low-lying areas—any standing water breeds pathogens;
- Any other activity that could provide a source of pathogens; and
- Any other hazard identified in 290.41(c) or
- Any other source of fecal matter.

Questions E.2.a. through E.2.f. are related and listed in order of potential public health risk. The possible responses are listed together after question E.2.f.

E.2.b. Are any hazards present within 50' of a well?

A hazard within 50' of a drinking water well would be a grave concern.

Some specific hazards are listed in §290.41(c)(1)(A). For example

- Tile or concrete sanitary sewer,
- Sewerage appurtenance,
- Septic tank,
- Storm sewer, or
- Cemetery.

Additionally, §290.41(c)(1)(D) lists livestock as a concern. Other hazards not specifically listed could also be a concern.

If a hazard exists within 50' of a well, answer **'Yes'** and explain it in the CARP. If not, answer **'No'**. Any answer of **'Unknown'** or **'N/A'** should be explained in the CARP.

E.2.c. Are any hazards present within 150' of a well?

A hazard within 150' of a drinking water well would be a concern.

Some specific concerns at this distance listed in §290.41(c)(1)(A) include:

- Septic tank perforated drainfield,
- Areas irrigated by low dosage,
- Low angle spray on-site sewage facilities,
- Absorption bed,
- Evapotranspiration bed,
- Improperly constructed water well, or
- Underground petroleum and chemical storage tank or liquid transmission pipeline.

Other hazards not specifically listed could also be a concern. If a hazard exists within 150' of a well, answer **'Yes'** and explain it in the CARP. If not, answer **'No'**. Any answer of **'Unknown'** or **'N/A'** should be explained in the CARP.

E.2.d. Are any hazards present within 300' of a well?

A hazard within 300' of a drinking water well could be a concern.

Three specific concerns at this distance listed in §290.41(c)(1)(B) include:

- Sewage wet well,
- Sewage pumping station, or
- Drainage ditch which contains industrial waste discharges or the wastes from sewage treatment systems.

Other hazards not specifically listed could also be a concern. If a hazard exists within 300' of a well, answer **'Yes'** and explain it in the CARP. If not, answer **'No'**. Any answer of **'Unknown'** or **'N/A'** should be explained in the CARP.

E.2.e. Are any hazards present within 500’ of a well?

A hazard within 500’ of a drinking water well could be a concern.

The specific concerns at this distance listed in §290.41(c)(1)(B) is:

- A sewage treatment plant.

Additionally, §290.41(c)(1)(C) lists concerns at this distance:

- Animal feed lots,
- Solid waste disposal sites,
- Lands on which sewage plant or septic tank sludge is applied, or
- Lands irrigated by sewage plant effluent.

Other hazards not specifically listed could also be a concern. If a hazard exists within 500’ of a well, answer **‘Yes’** and explain it in the CARP. If not, answer **‘No’**. Any answer of **‘Unknown’** or **‘N/A’** should be explained in the CARP.

E.2.f. Are any hazards present within a quarter mile of a well?

A hazard within a quarter mile of a drinking water well could be a concern, especially in karstic limestone or other fractured or porous rock.

Some potential hazards listed in §290.41(c)(1)(E) include:

- Abandoned or inoperative wells (unused wells that have not been plugged)
- Landfill and dump sites,
- Animal feedlots,
- Military facilities,
- Industrial facilities,
- Wood-treatment facilities,
- Liquid petroleum and petrochemical production,
- Storage, and transmission facilities,
- Class 1, 2, 3, 4, and 5 injection wells, and
- Pesticide storage and mixing facilities.
- Existing or potential pollution hazards

Other hazards not specifically listed could also be a concern. If a hazard exists within a quarter of a mile from of a well, answer **‘Yes’** and explain it in the CARP. If not, answer **‘No’**. Any answer of **‘Unknown’** or **‘N/A’** should be explained in the CARP..

E.1.a,-f. Responses:

The responses to questions E.2.a. through f. are related.

E.2.a-f. Correction Options:

If any wells do not meet the setback distances, contact the TCEQ to discuss how to achieve compliance.

E.2.a-f. TCEQ Follow-Up:

Failure to document the method used to keep contaminants away from the well head may be a violation. The TCEQ will consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

E.3.a. Is the exposed portion of each well sanitary and in good condition?

The questions in E.2.a through E.2.d are intended to assess the potential for contaminants to enter wells through leaks or other symptoms of poor sanitation. You can review the records of TCEQ Comprehensive Compliance Investigations to determine whether any historical issues have been identified by the TCEQ.

Every area with wells must be sanitary, in order to ensure that pathogens cannot enter the water. Hazards can be caused when there are conditions that provide a pathway—like unscreened vents. All areas around a well should be sanitary and well maintained. An on-site examination of well areas should be performed in order to identify any potential unsanitary or poor conditions.

There are numerous TCEQ rules related to minimum standards for allowing hazards near wells. For example, §290.41(c)(3)(I) requires that the well site be fine graded so that the site is free from depressions, reverse grades, or areas too rough for proper ground maintenance so as to ensure that surface water will drain away from the well and provides additional requirements for collecting and draining water away from the well.

Additionally, §290.46(m) requires that PWSs ensure the good working condition and general appearance of the system's facilities and equipment. The grounds and facilities shall be maintained in a manner so as to minimize the possibility of the harboring of rodents, insects, and other disease vectors, and in such a way as to prevent other conditions that might cause the contamination of the water.

Answer **'Yes'** if the well and surrounding area is sanitary; answer **'No'** if not. Any answer of **'Unknown'** or **'N/A'** should be explained in the CARP.

E.3.b. Are well heads protected from flooding?

Any flooding that impacts a well could be a pathway for pathogens. Flood water contains all the dirt picked up by the flood, including animal feces from the ground and human feces from compromised sewage systems.

The rules in §290.41(c)(1) describe how groundwater sources must be located for protection from floods. Specifically, 290.41(c)(3)(K) notes that wellheads and well vents shall be at least two feet above the highest known watermark or 100-year flood elevation, if available, or adequately protected from possible flood damage by levees. Additional protection is provided by the rules in §290.41(c)(3)(L) which states that if a well blow-off line is provided, its discharge shall terminate in a downward direction and at a point which will not be submerged by flood waters. Further, §290.41(c)(3)(J) requires that wells have a concrete sealing block extending at least three feet from the well casing in all directions, with a minimum thickness of six inches and sloped to drain away at not less than 0.25 inches per foot shall be provided around the wellhead.

With changes in weather patterns, the 100-year flood elevation may change also. Also, growth in an area may cause local floods to disseminate less quickly because of more impermeable cover. Therefore, consider any potential risk from flooding, in addition to the situations specifically addressed by rule.

E.3.b. Correction Options:

If any wells are at risk of pathogen contamination take action to either remove the hazard or modify the well to be protected. If any wells do not meet the requirements of §290.41 or the conditions of a TCEQ exception approval letter, consult with the TCEQ to discuss how to achieve compliance.

E.3.b. TCEQ Follow-Up:

Noncompliance with §290.41 may be a violation. Historical issues may have been identified by the TCEQ.

The TCEQ will consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

E.3.c. Are all well heads secured properly?

If a wellhead is not secured properly, a pathway for pathogens may be created. The TCEQ rules describe the minimum standards for securing a wellhead, specifying that wellheads and pump bases shall be sealed by a gasket or sealing compound and properly vented to prevent the possibility of contaminating the well water [§290.41(c)(3)(K)]. More general protection is also needed, in that the area where wells are located must be secured and locked so that wells cannot be vandalized [§290.41(c)(3)(O)].

Review your records and well plans and specifications to determine whether all wells either meet the requirements of §290.41(c) or are operating under the conditions put in place by a site-specific TCEQ exception approval letter.

Review the records of TCEQ Comprehensive Compliance Investigations to determine whether any historical issues have been identified by the TCEQ.

Answer **'Yes'** if the well cap is secure; answer **'No'** if not.

E.3.c. Correction Options:

If any wells do not meet the requirements of §290.41, or the conditions of a TCEQ exception approval letter, contact the TCEQ to discuss how to achieve compliance.

E.3.c. TCEQ Follow-Up:

Noncompliance with §290.41 may be a violation. The TCEQ will consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

E.3.d. Are openings (e.g. vents) built to minimize contamination?

It is natural that openings are needed on wells—notably air release valves and overflows. However, if those opening are too large, insects and other varmints can get into the well. The most common insect that contaminates wells is a fly which can enter through holes over 1/16". The flies can lay eggs on pipe walls, and when the eggs hatch, the larvae (worms) can be distributed to customers.

TCEQ's rules include minimum protection standards, for example well casing vents openings must be covered with 16-mesh or finer corrosion-resistant screen, facing downward, elevated [§290.41(c)(3)(K)]. Further, all openings to the atmosphere shall be covered with 16-mesh or finer, corrosion-resistant screening material or an acceptable equivalent according to §290.41(c)(3)(Q).

Review your records and well plans and specifications to determine whether all wells either meet the requirements of §290.41(c) or are operating under the conditions put in place by a site-specific TCEQ exception approval letter.

Review the records of TCEQ Comprehensive Compliance Investigations to determine whether any historical issues have been identified by the TCEQ.

Answer **'Yes'** if well caps are vented and screened appropriately; answer **'No'** if not.

E.3.d. Correction Options:

If any wells do not meet the requirements of §290.41, or the conditions of a TCEQ exception approval letter, contact the TCEQ to discuss how to achieve compliance.

E.3.d. TCEQ Follow-Up:

Noncompliance with §290.41 may be a violation. The TCEQ will consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

E.4. Have there been any extreme weather events impacting any well?

Consider flooding, drought, rapid snow melt, or other events.

Consider whether flooding, drought, rapid snow melt, or other events may have caused a degradation of the well water quality. If so, report what happened.

Answer **'Yes'** if weather impacted a well. Answer **'No'** if not.

E.4. Correction Options:

The TCEQ may have the ability to assist you in recovering from an extreme weather event. Contact the Water Supply Division at 512-239-4691 during business hours, or by mail at PO Box 13087, Austin, TX 78711.

You can also contact your Regional TCEQ Office.

E.4. TCEQ Follow-Up:

The TCEQ takes extreme weather events into consideration when determining compliance. During Hurricane Ike, water systems recovering from flooding were given special consideration. During the 2011-2015 drought, the TCEQ prioritized PWSs whose sources were impacted by drought.

E.5. Have there been any security breaches impacting any well?

Check **'Yes'** and report on any vandalism or security issues at a well, if any occurred. Answer **'No'** if not.

PWSs should report any security issues to the Water Supply Division at 512-239-4691 and contact your Regional Office

E.5. Correction Options:

If you have not already consulted with the TCEQ's Water Supply Division, call them at 512-239-4691 and contact your Regional Office. Ensure vandalism warning signs are posted at every well site and water treatment facility.

If the fence or gate is broken, they must be repaired. If branches overhang the fence, they must be trimmed.

E.5. TCEQ Follow-Up:

The TCEQ documents security issues at PWSs in order to coordinate with Regional Offices, the State Operations Center, or other state offices.

E.6. Does the PWS implement a Source Water Protection Program?

Answer **'Yes'** if you implement a Source Water Protection Program. Answer **'No'** if you do not.

E.6. Correction Options:

Implementing a Source Water Protection Program (SWPP) is a TCEQ voluntary program. However, water systems are urged to implement a SWPP as it can significantly reduce contaminant loading to your water source.

Consult with the authorities which have jurisdiction over the watershed your water sources are located and forge a relationship with them if you've not done so. You will be able to gather very important data from them regarding any potential contaminant sources which may be present in your watershed (septic systems, confined animal feeding operations (CAFO), etc.).

E.6. TCEQ Follow-Up:

TCEQ can provide assistance to help you set up a Source Water Protection Program. Contact the Water Supply Division at 512-239-4691, or by mail at PO Box 13087, Austin, TX 78711.

E.7. Does the PWS implement a Triggered Source Monitoring Plan?

If the PWS has implemented a Triggered Source Monitoring Plan (TSMP) under the Ground Water Rule to control the sampling performed at raw sites after a TC+ check **'Yes.'** If not, check **'No.'**

A TSMP is of greatest benefit to systems with multiple wells and/or wholesale/purchase contracts with other systems that operate wells.

Water systems do not have to develop and implement a TSMP; however, if they get a TC+ then they must take raw water samples at all groundwater sources operating at the time the TC+ was collected. Developing a TSMP will allow a system to identify which sources serve the area where the positive was collected and only sample those wells when there is a positive.

E.7. Correction Options:

If you develop a TSMP clearly identifying which wells serve which areas of your distribution and can also identify wells that are getting 4-log removal credit, then you will not have to take raw samples at every one of your wells when you collect a TC+.

Developing a plan like this also gives the water system much more knowledge over what is influencing certain parts of their distribution systems. This information is helpful when troubleshooting.

E.7. TCEQ Follow-Up:

If you have questions about TSMPs, you can contact the Water Supply Division at 512-239-4691.

Section F—Source—Purchased Potable Water

If you do not have any purchased water sources, check '**N/A**' and skip to the next section.

The critical control point in a wholesale/purchased-water relationship is where the water changes ownership. That location is defined as the 'entry point' to the purchaser's distribution system.

If any discussion about the source of some water quality issue comes up, it is important to have data representing the quality of the water when it switches ownership.

Often, however, a smaller PWS may use samples collected at the first customer to represent the water quality they are buying, because an entry point sample tap is not available [§290.103(13), §290.103(14)]. If the Assessor finds issues related to purchased water, the sample site should be described.

Questions:

These questions are intended to help you assess your purchased water source.

Often, PWSs that purchase and redistribute water have questions about why they must comply with TCEQ's regulations. The reason is that they are responsible for keeping the water safe until it has reached their customers' tap.

For example, if a purchased-water system has a cross connection that contaminates water inside their service area, it is the purchased-water system's issue—not the supplier.

Purchased water source issues may or may not be violations of TCEQ regulations.

Assistance:

The TCEQ rules in provide some guidance on interconnections [§290.44(g), §290.46(k)].

CARP

If there are any issues with purchased sources, those should be described in the CARP.

F.1. Do all purchased water sources have entry point sample taps?

The term entry point is defined as 'any location where treated water enters the distribution system.' Therefore, even purchased-water sources need a location where samples can be collected at all points of delivery of potable water for re-distribution.

Does the PWS have a tap where they can routinely sample the quality of the water provided by the wholesale provider? If so, check **'Yes.'** If not, check **'No.'**

F.1. Correction Options:

Every PWS should have a sampling tap representative of each point that water enters the distribution system. This entry point should be documented in the PWS's Monitoring Plan. Update your entry point sample sites in your Monitoring Plan and inform TCEQ of any changes.

If the purchased water quality is monitored, and does not meet specifications, review your contract. If your contract has provisions establishing minimum quality, discuss any failures to meet those provisions with the supplier.

If the contract does not establish the minimum water quality, consider revising it.

F.1. TCEQ Follow-Up:

TCEQ staff will the review the Monitoring Plan when it is received. Keep a copy of the up-to-date Monitoring Plan and ensure it is available for review during any future inspection.

F.2. Are all the take-point meters, vaults, and sample taps sanitary?

The entry-point sample site should be clean and accessible. It is important to know the water quality entering the system, so you can tell how much it degrades over time.

Additionally, you must be able to sample this water to establish appropriate chemical feed rates if you are booster chlorinating. Failure to properly monitor here when a system is booster chlorinating, chloraminated water, can lead to significant nitrification issues and taste and odor complaints.

If the cleanliness of the purchased source entry point (take point) is unknown, go look. Check **'Yes'** to verify that routine entry point sampling is occurring at a sanitary sample tap. Or, check **'No'** to document entry point issues.

F.2. Correction Options:

Ensure that entry point sample sites have clean, easy-to-reach sample taps. This is a very important monitoring location, so you want to be sure your data is accurate.

F.2. TCEQ Follow-Up:

Failure to have entry point sample sites is a violation of numerous sections under Subchapter F. Failure to maintain PWS facilities in a sanitary manner may be identified as a violation of §290.46(m) relating to Maintenance.

F.3. Has extreme weather impacted any purchased source recently?

Report whether flooding, drought, ice, or fire may have caused a degradation of the purchased-water quality.

Review purchased-water entry point data and evaluate whether significant changes have occurred after the weather event. Communicate with the seller to determine if they experienced issues.

F.3. Correction Options:

The TCEQ may have the ability to assist you in recovering from an extreme weather event. Contact the Water Supply Division at 512-239-4691 & your Regional Office.

F.3. TCEQ Follow-Up:

The TCEQ takes extreme weather events into consideration when determining compliance. During Hurricane Ike, water systems recovering from flooding were given special consideration. During the 2011-2015 drought, TCEQ prioritized PWSs whose sources were impacted by drought. Consult with TCEQ to find out your options.

F.4. Have there been security breaches impacting any purchased source?

PWSs should report any security issues to the Water Supply Division at 512-239-4691.

Report on any vandalism or security issues at any purchased-water entry point; if any occurred answer 'Yes,' if not, answer 'No.'

F.4. Correction Options:

If you have not already consulted with the TCEQ's Water Supply Division, call them at 512-239-4691. You can also contact your Regional TCEQ office.

Ensure vandalism warning signs are posted at every well site and water treatment facility.

F.4. TCEQ Follow-Up:

The TCEQ documents security issues at PWSs in order to coordinate with Regional Offices, the State Operations Center, or other state offices.

Section G—Source—Surface Water Sources

If you do not have any surface water or GUI sources, check **'N/A'** and skip to the next section.

Questions:

These questions are intended to help you assess your surface water source(s) and determine whether degradation in source water could have caused degradation in distribution water quality.

Purpose:

Surface water sources are open to the environment making them more susceptible to microbe or pathogen contamination. Treatment technique regulations ensure that these microbes and pathogens are removed and inactivated. However, degradation in the source water can elevate the risks associated with microbes and pathogens passing through treatment and entering the distribution system.

Surface water source issues may or may not also be violations of TCEQ regulations in 30 TAC §290.41(e).

Answers:

You can check to make sure you meet the requirements for surface water sources by looking at the rules in §290.41(e).

CARP

If there are any issues with surface water sources or intakes, those should be described in the CARP. Surface water treatment issues would be described under Section H.

G.1. Is every surface water intake designed and operated correctly?

Design: Review your plans, specifications, and compliance documentation to confirm that your intake meets all of the requirements in §290.41 related to preventing contaminants from entering the treatment plant through the intake structure.

Construction: Review your plans and/or other historical documentation such as Comprehensive Compliance Investigation reports to determine whether the intake was constructed as designed.

Operation: Also, review maintenance and inspection records to confirm that the intake screens have been properly managed, and that routine inspections are performed.

If you have a variable level intake structure are you pulling water in from the level with the best water quality? Are variable-level intakes being operated as intended? Has the water quality degraded due to collecting water from the intake with the poorest water quality?

Answer **'Yes'** if the intake is consistent with regulations and plans, inspections are performed, and variable level intake is operated appropriately. Answer **'No'** if not.

G.1. Correction Options:

If your surface water intake is not approved, contact the TCEQ Plan and Technical Review Section at 512-239-4691 to submit plans for correcting the issues, or seeking an exception under §290.39.

If inspections are not being performed, schedule those. If operating a variable level intake correctly could improve source water quality, do so.

G.1. TCEQ Follow-Up:

Failure to have TCEQ approval for a surface water intake or, alternatively, to operate in accordance with a TCEQ site-specific exception letter is a violation.

Keep documentation of consultation regarding surface water intake compliance for review during any TCEQ file review or on-site inspections.

G.2. Did potential sources of contamination impact an intake?

Review maps, easements, and other documentation—for example, your Source Water Protection Program—to determine whether potential sources of contamination could be near the intake. Consider the location of potential sources of contamination—just as with wells, the closer the contaminant, the more risk of a pathway for pathogens.

Review the regulations for setback requirements in §290.41(e). Review any TCEQ compliance documentation related to set-back distances. For example, certain hazardous facilities should be 75 feet horizontally from the lake water surface at the uncontrolled spillway elevation of the lake or 75 feet horizontally from the 50-year flood elevation, whichever is lower [§290.41(e)(1)(C)]:

- Septic tanks and soil absorption fields,
- Tile or concrete sanitary sewers,
- Sewer manholes, or
- Other approved toilet facilities.

A restricted zone of 200 feet radius from the raw water intake works shall be established and all recreational activities and trespassing shall be prohibited in this area [§290.41(e)(2)(C)] and intakes shall not be located within 500 feet of a sewage treatment plant or lands irrigated with sewage effluent [§290.41(e)(2)(G)].

Other risks should not be within 1,000 feet of a surface water intake [§290.41(e)(2)(B)]:

- Boat launching ramps,
- Marinas,
- Docks, or
- Floating fishing piers which are accessible by the public.

G.2. Correction Options:

Seek approval of plans to modify any non-compliant facilities, and/or seek an exception to the rules—with the understanding that the TCEQ's approval will set additional regulatory conditions, if your request is approved.

G.2. TCEQ Follow-Up:

Failure to operate according to the set-back requirements of §290.41—or, alternatively, to operate in accordance with a TCEQ site-specific exception letter—is a violation.

Keep documentation of consultation regarding surface water intake compliance for review during any TCEQ file review or on-site inspections.

G.3. Has extreme weather impacted any intake recently?

Consider whether flooding, drought, rapid snow melt, or lava may have caused a degradation of the source water quality to the extent that it could have adversely impacted the ability of the plant to treat water. If so, report what happened.

G.3. Correction Options:

If you are experiencing a drought and you are limited to pulling water from the level with the poorest water you may want to request emergency approval to deploy an intake in an area of the lake or river with better water quality (pontoon/barge intake, etc.). The TCEQ may have the ability to assist you in recovering from an extreme weather event. Contact the Water Supply Division at 512-239-4691 and your Regional TCEQ Office.

G.3. TCEQ Follow-Up:

The TCEQ takes extreme weather events into consideration when determining compliance. During Hurricane Ike, water systems recovering from flooding were given special consideration. During the 2011-2015 drought, TCEQ prioritized PWSs whose sources were impacted by drought.

G.4. Has a security breach or vandalism occurred at any intake?

Report on any vandalism or security issues at a surface water intake. Check 'Yes' if any occurred. PWSs should report any security issues to the Water Supply Division at 512-239-4691 and your Regional TCEQ office.

G.4. Correction Options:

If the vandalism occurred as a result of improper maintenance of intruder resistant fencing, correct the problem as soon as possible. If you have not already consulted with the TCEQ's Water Supply Division, call them at 512-239-4691 and contact your Regional TCEQ office.

G.4. TCEQ Follow-Up:

The TCEQ documents security issues at PWSs in order to coordinate with Regional Offices, the State Operations Center, or other state offices.

Treatment—Section H

If you have ***any*** treatment at all, including booster disinfection, complete this section.

Only if you operate ***no treatment whatsoever***, check **'N/A'** and skip to the next section.

Questions:

These questions are intended to help you assess whether your treatment facilities are fully functional.

Purpose:

Every PWS that owns or operates a raw water source must implement a disinfection protocol. Increased attention to disinfectant residuals has caused more PWSs to install booster treatment facilities in the distribution system to maintain acceptable free chlorine or total chlorine levels.

The rules for drinking water treatment plant design are in §290.42. Many of the rules for treatment plant operation are in §290.46. Treatment protocols must maintain drinking water quality within the standards of Chapter 290, Subchapter F.

PWS maintenance reports and work orders will help you answer the questions. You can check to make sure you meet the requirements for interconnections with other PWSs and purchased water sources by looking at the rules in §290.41.

Assistance:

The TCEQ can provide assistance. Contact 512-239-4691 or your Regional TCEQ office.

The TCEQ's Small Business and Local Government Assistance program can also provide assistance. You can contact them toll free at 1-800-447-2827 or on the web at:

www.tceq.texas.gov/assistance

CARP

If there are any issues with treatment, those should be described in the CARP.

H.1. Have there been any interruptions in treatment?

If any treatment processes stopped working for more than 1 day, check **'Yes.'** If not, check **'No.'**

H.1. Correction Options:

If the treatment process that stopped working was related to disinfection or turbidity removal, you have 5 days to initiate repairs or equipment replacement.

If the treatment process that stopped working is not related to primary chemical compliance or exception conditions, TCEQ may consider an extension request. For example, fluoridation.

H.1. TCEQ Follow-Up:

Noncompliance with §290.41 may be a violation. The TCEQ will consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

H.2. Is redundant equipment available as required? (e.g.: disinfectant feed)

If you have all of the required redundant pumps, meters, etc. as required, check **'Yes.'** If any treatment units are missing required redundant units, check **'No.'**

H.2. Correction Options:

The rules in §290.42 require redundancy for crucial treatment processes.

This is a TCEQ requirement for treatment processes such as disinfection, coagulation, etc. Additionally, provide standby equipment that is kept onsite to be used in the case of equipment failure or have a contract with a company that can deliver the equipment rapidly.

H.2. TCEQ Follow-Up:

Noncompliance with §290.42 may be a violation. The TCEQ may consult with you regarding this situation. An on-site investigation by TCEQ may be scheduled.

Keep documentation of your communication with the TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

H.3.a. Have changes been made to any treatment processes?

Sometimes, a change in the treatment process has unintended consequences. Consider whether a recent change was made to your treatment process which could potentially allow or cause the presence of TC+.

If any changes were made, regardless of whether you think they were related to the TC+, answer **'Yes.'** If not, answer **'No.'**

Report on any changes in the CARP.

H.3.b. If so, did the change impact the corrosivity of the water?

If any changes were made, consider whether they may have impacted the corrosivity—whether intentionally or unintentionally. If so, answer **'Yes.'** If not, answer **'No.'**

Sometimes, a change is made for some specific purpose, and the change has unintended consequences. For example, a surface water treatment plant may decrease the pH to help coagulation. A change like that can impact corrosivity.

This question is present because corrosive water can cause leaks that can allow pathogen intrusion and PWSs are required to notify the TCEQ of any such change in accordance with §290.39(j)(2)(A).

Report on any changes in the CARP.

H.3.a & b. Correction Options:

First evaluate whether the change in treatment was directly related to the TC+. Next, consider any indirect variables that could have been responsible for the TC+. Determine the correction options based on your evaluation.

If the corrosivity of the water is an issue, determine how you can fix that, and do so.

Also, make sure that all your treatment facilities comply with the TCEQ design rules in §290.42.

H.3.a & b. TCEQ Follow-Up:

Noncompliance with §290.42 may be a violation. If the treatment change caused degradation of water quality, the TCEQ may consult with you regarding this situation. An on-site investigation by the TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

H.4. Are all treatment processes correctly maintained and operational?

Treatment processes need to be maintained and operated, or there is a potential risk that they will fail, leading to the introduction of pathogens into the distribution system. For example, if you do not change the oil in an engine, it will break sooner than if you did.

Consider all of your treatment processes. Think about whether all pumps are working, whether meters are reporting correctly so that chemicals can be fed correctly, whether all treatment chemical lines are free of leaks, and whether periodic observations are made so that any problems are caught.

If all treatment processes were operating correctly, answer **'Yes.'** If not, answer **'No.'**

H.4. Correction Options:

Review the operational status of your equipment. Consider whether you have a successful method for ensuring that needed repairs are made in a timely fashion, and that future maintenance and replacement needs are considered.

H.4. TCEQ Follow-Up:

Failure to maintain and operate equipment correctly may be a violation of the TCEQ rules in Chapter 290.

H.5. Is all water quality data within the system's normal ranges?

Review recent treatment data. Consider what the normal ranges of measured chemicals are for your treatment plants.

Do the levels of pH, temperature, free chlorine, total chlorine, alkalinity, hardness and other common measurements look normal, or do they fluctuate wildly? If there are abnormal changes in the water quality, consider whether that might be related to the TC+.

Look at your chemical usage reports. Has there been an unusual change in how much chlorine you use? This could be an indication of abnormality.

If no abnormal results are observed, check **'Yes.'** If abnormal results were seen, check **'No.'**

H.5 Correction Options:

Your correction options will depend on what the abnormal situation or changes were, and whether you determine that they are connected with the TC+.

H.5 TCEQ Follow-Up:

The TCEQ follow-up would depend on the severity of the issue.

H.6. Is the water corrosive?

Corrosive water can cause leaks in metal pipes, valves, and solder.

Large PWSs are required to determine the optimal corrosion control treatment (OCCT) through a corrosion control study (CCS) and set optimal water quality parameters (OWQPs). A large system should determine whether any changes have occurred to their corrosion control methods that could cause the water to have become 'aggressive'—meaning corrosive.

Small PWSs must identify OCCT if they exceed a lead or copper Action Level. Many small PWSs use corrosion control techniques proactively, to keep the distribution pipes safe.

If you determine that the water is not corrosive, check **'No.'** If corrosivity is an issue, check **'Yes.'**

H.6 Correction Options:

Your correction options will depend on what the abnormal situation or changes were, and whether you determine that they are connected with the TC+.

H.6 TCEQ Follow-Up:

The TCEQ follow up would depend on the severity of the problem.

H.7. Have all SWTPs met all Contact Time (CT) and turbidity requirements recently?

If your PWS does not operate a SWTP, check **'N/A'** and skip to the next question.

SWTPs take water of relatively poor quality, subject to all the pollution in the environment, and treat it to make safe, potable water. The TCEQ monitoring and reporting requirements are described in 290.111. Turbidity removal is a critical step because it removes protozoan cysts, and other material. Contact time (inactivation) is critical to kill or sterilize the microbes that are not removed.

PWSs that operate SWTPs should review the recent data and determine if turbidity removal and inactivation (CT) was successful over the two months before the triggering event and in the current month through the date of the triggering event.

If the CT and turbidity requirements were met continuously during this period, check **'Yes.'** If not, answer **'No.'**

H.7. Correction Options:

If your review of recent data shows any issues meeting CT, consider making changes to disinfection protocols to ensure that you are using the disinfectants most efficiently.

H.7. TCEQ Follow-Up:

Failure to meet CT for over 4 hours is a treatment technique violation. If you experience low CT, contact the TCEQ's Water Supply Division immediately at 512-239-4691, or by email at PDWS@tceq.texas.gov.

The TCEQ Water Supply Division staff will the review the SWMORs. Keep a copy of the up-to-date SWMORs and source data and ensure they are available for review during any future inspection.

H.8. If a well is required to have 4 log viral inactivation, is it reliable?

If your PWS does not have wells, check **'N/A'** and go to the next question.

If your PWS has wells, but they do not require or have 4-log treatment, check **'N/A.'**

The Ground Water Rule requires some PWS wells to be treated because of the possible presence of viral contamination (per §290.109 and §290.116). Review well records to determine whether or not your wells are required to have 4-log viral inactivation. If so, are the facilities for disinfection treatment in good operating order and sized properly? Are any parts broken?

If your PWS has wells that have 4-log viral inactivation treatment, and there were no issues related to that treatment, answer **'Yes.'** If your PWS has wells with 4-log treatment, and the treatment broke, hiccupped, or otherwise was imperfect, answer **'No.'**

H.8. Correction Options:

Repair or correct any insufficiently sized or inoperable treatment processes or equipment.

H.8. TCEQ Follow-Up:

Noncompliance with §290.42 may be a violation. The TCEQ will consult with you regarding this situation. An on-site investigation by the TCEQ may be scheduled.

Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

H.9. Is water disinfected before a ground storage tank? (not a pressure tank)

If your PWS does not have wells, check **'N/A'** and go to the next question.

Well water is likely to contain viruses, if not other pathogens. Therefore, best practice is to ensure that the chlorine has long enough to kill viruses before it gets to the first customer. The TCEQ's minimum requirements in §290.42(e)(2) state that the point of chlorine application must be ahead of the water storage tank(s) if storage is provided prior to distribution.

If your PWS's well water goes to storage before distribution, answer **'Yes.'** If not, answer **'No.'**

H.9. Correction Options:

Repair or correct any treatment processes or equipment.

H.9. TCEQ Follow-Up:

Noncompliance with §290.42(e)(2) may be a violation. The TCEQ will consult with you regarding this situation. Keep documentation of your communication with TCEQ for review during future inspections. Documentation may include e-mails, letters, and maps.

Distribution—Sections I, J, and K

Section I—Distribution Facilities

Questions:

These questions are intended to help you assess whether your distribution facilities are fully functional.

Purpose:

These questions are intended to help you assess your distribution facilities.

For example, the questions ask about events that could cause leaks or breaks, like construction or repair activities. Also, they ask about the general condition of the pipes, pumps, and other equipment.

Distribution facilities are critical infrastructure directly related to the ability to keep water clean all the way to the delivery point. Leaks and breaks in pipes and appurtenance can provide a pathway for pathogens to enter the distribution system.

A **small system** with one pressure plane should evaluate pressure and usage throughout the entire distribution system.

A **large system** must evaluate pressure in the area surrounding the TC+. This area must be large enough to capture any potential impacts from usage and pressure. For example, the pressure plane, neighborhood, or industrial area where the TC+ occurred.

The rules in §290.44 describe the minimum design standards for distribution facilities, for example separation distances between sewer lines and drinking water lines.

Distribution-facility issues may or may not also be violations of TCEQ regulations.

Assistance:

Use the PWSs plans, specifications, maintenance records, construction records, and distribution map to help you answer the questions. The rules for distribution facilities are in §290.44. There are distribution monitoring requirements in §290.46 and throughout Chapter 290, Subchapter D.

§290.44(f) describes requirements for disinfection related to post-construction activities.

CARP:

If there are any issues with distribution facilities, those should be described in the CARP.

I.1.b. Are distribution facilities built to protect from sewage?

TCEQ rules include requirements that sewer lines are separated from drinking water lines, and many other detailed rules exist to protect from contamination.

If your distribution facilities comply with all TCEQ requirements, check **'Yes.'** If not, answer **'No.**' For this question, if records are not available, an answer of **'Unknown'** may be needed; any answer of 'Unknown' should be explained on the CARP.

Review your distribution design records and TCEQ compliance documentation. Review the distribution map to determine whether the data indicates an infrastructure failure. For example, if there are areas where sewage pipes and water pipes are in the same trench, is that near the location of the TC+?

As you answer these questions, consider whether 'hydraulic' dead-ends exist. A hydraulic dead end is where water moves back and forth, instead of always one direction. As it sloshes back and forth, water can get very old and its quality can degrade.

I.1. Correction Options:

If the engineering process at your system is not protective, make sure future engineered designs are compliant with the rules in §290.44.

If the design of the distribution system is okay, but it was constructed wrong, make changes in how you get construction done so that future construction is better.

Be aware that the TCEQ requires that PWS designs ensure circulation of water with a minimum of dead ends. All dead-end mains shall be provided with acceptable flush valves and discharge piping (unless they are less than two inches in diameter and end at a customer service. Where dead ends are necessary as a stage in the growth of the system, they shall be located and arranged to ultimately connect the ends to provide circulation. This requirement must be passed down to builders and developers.

I.1. TCEQ Follow-Up:

Noncompliance with §290.44 may be a violation. Keep documentation for review during future inspections. Documentation may include plans, specifications, engineer's reports, TCEQ correspondence, maintenance reports, e-mails, letters, and maps.

I.2. Are all pumps, valves, and meters maintained and operational?

Check **'Yes'** if all of the pressure maintenance, flow control, flushing valves hydrants, booster pumps, or other appurtenances were maintained and operational. If not, answer **'No.'** Then, consider if that could have caused contamination and the TC+.

I.2. Correction Options:

If inoperable or poorly maintained equipment is present, and led to contamination, make repairs. Evaluate your procedures for maintenance and revise them if insufficient. If the procedures do not ensure that needed maintenance is performed, revise them.

Have flowmeters calibrated.

Periodically exercise all the valves in your system to make sure that they will turn smoothly, and that they are in the right position. Document how to do this and train any other folks working in distribution on making sure that valves are re-set correctly after work is done.

I.2. TCEQ Follow-Up:

Noncompliance with §290.44(m) maintenance requirements may be a violation. If operational failures caused degradation of water quality, the TCEQ may consult with you regarding this situation. Keep copies of related documentation and ensure it is available for TCEQ review.

I.3. Was there any planned work in the area of the TC+?

This question is asking about any distribution work that you did that was **planned**.

If there was planned construction or repair happening in your system around the time of the TC+, check **'Yes**.' Then, consider whether the construction could have inadvertently led to dirt or dirty water getting into the distribution-pipes. If there was no planned work, check **'No**.' If you do not know, call someone who would know.

For planned construction or repair, a PWS has the opportunity during the planning stages to make sure that all the procedures will protect the water. For example, by working with the construction crew and helping with disinfection procedures.

During the planning, ensure that the SOP for disinfecting pipes after the construction or repair follows American Water Works Association (AWWA) standards after completion (see Question I.4.).

I.3. Correction Options:

If you believe that the construction activities led to contamination, consider immediately re-disinfecting the contaminated area according to American Water Works Association (AWWA) standards. Evaluate your procedures for construction and post-construction disinfection procedures—particularly for isolating construction areas and disinfecting after construction—and make sure that they are adequately protective and are consistent with AWWA standards.

If your construction and post-construction maintenance and disinfection procedures do not provide the level of protection from microbe contamination that is required to protect human health, then revise them. Make sure you implement AWWA standards for disinfection related to distribution lines, storage facilities, valves, etc.

I.3. TCEQ Follow-Up:

TCEQ staff will the review your description of any events in the CARP to determine any specific follow-up. Keep copies of related documentation and ensure it is available for TCEQ review.

I.4. Was there any unplanned repair work (or emergency construction)?

This question is asking about any distribution work that you did that was **not planned**, but instead was performed in response to some change or problem.

If you had to fix a main break or other distribution issue in the two weeks before the TC+, check **'Yes.'** Then, consider whether that break or the way it was repaired could have caused contamination.

Do you follow an SOP for repairs? If so, does it include isolating the area? Are valves and appurtenances tight against leakage? Does the SOP include disinfection in accordance with AWWA standards (See Questions I.3.).

I.4. Correction Option:

If you believe that the repair led to contamination, consider re-disinfecting the contaminated area. Look at your procedures for repair—particularly for isolating the area and post- disinfection. If the procedures are not adequately protective, fix them.

I.4. TCEQ Follow-Up:

TCEQ staff will the review your description of any events in the CARP to determine any specific follow-up. Keep copies of related documentation and ensure it is available for TCEQ review.

I.5. If there was repair or construction, was the area properly disinfected before being placed back into service?

If there was no (planned or unplanned) repair or construction, check **'N/A.'**

If there was either planned or unplanned repair or construction, and the area was not disinfected after the work, check **'No.'**

If there was either planned or unplanned repair or construction, and the area was disinfected after the work, and the results of the disinfection show you had a high enough chlorine/chloramine residual for long enough time, check **'Yes.'**

If you don't know, consider who would know, and call them.

I.5. Correction Option:

If you checked, 'No,' return to the impacted area, collect coliform and disinfectant residual samples, and flush local dead-end mains. If any indication of contamination is present, re-disinfect the area in accordance with §290.46(g).

The following description of disinfecting construction/repair sites does not replace AWWA standards, but serves as a general guide.

Generally speaking, your disinfection protocol should ensure that you hold a 25 mg/L residual for 24 hours (not less than 10 mg/L after the 24 hour hold). A continuous feed of chlorine should be used.

Under emergency conditions, the 'slug method' may be used. In the slug method, you must ensure that a 'slug' of water with 100 mg/L contacts each portion of pipe for at least 3 hours. If the concentration drops, decrease flow or add more chlorine. If it goes below 50 mg/L, start over.

Whatever method is used, monitor and record the chlorine residual and flow (if applicable).

Liquid hypochlorite or gas chlorine are preferred. Granular hypochlorite can be used for the slug method. If it is a very short pipe, pellets may be ok.

Operate related valves and hydrants as the chlorinated water flows past fittings and valves, to disinfect appurtenances and pipe branches.

Be careful how you dispose of the super-chlorinated water. If you are going to put it in a ditch or gutter that runs into a stream, you must dechlorinate it. If you put it in a sewer, talk to the wastewater operators or TCEQ Regional office folks first.

Before returning the pipe to service, you need to collect at least one coliform sample every 1,000 feet of pipe and get results that have zero bacteria (absence of coliform bacteria). If you can't do that, and you need to get the water on before you get the clean samples, **you must issue a boil water notice**.

I.5. TCEQ Follow-Up:

TCEQ staff will the review your description of any events in the CARP to determine any specific follow-up. Keep copies of related documentation and ensure it is available for TCEQ review.

Noncompliance with the post-disinfection requirements in §290.46(g) may be a violation. Keep documentation for review during future inspections. Documentation may include maintenance reports, boil water notice documentation, e-mails, letters, and maps.

Section J—Distribution Pressure and Usage

Questions:

These questions are intended to help you go through the process of accessing your distribution system pressure and usage, and whether that could have caused a TC+.

A **small system** with one pressure plane should evaluate pressure and usage throughout the entire distribution system.

A **large system** must evaluate pressure in the area surrounding the TC+. This area must be large enough to capture any potential impacts from usage and pressure. For example, the pressure plane, neighborhood, or industrial area where the TC+ occurred.

The minimum allowable normal operating pressure in distribution is 35 psi. If increased usage for fire flow occurs, the pressure must never drop below 20 psi. Pressure drops below 20 psi may require a boil water notice (BWN). Best practice is to document the cause of all pressure drops below 35 psi to ensure that the water system is providing continuous and adequate supply of potable water to its customers.

Maintaining pressure in the distribution system is important because it gets water to its intended destination, but also because as long as the pressure inside the pipe is higher than the pressure outside the pipe, water will tend to flow from the inside out during leaks.

If pressure in the pipe is lower than the pressure outside the pipe, contamination from the dirt around the pipe can be sucked into the distribution system. Additionally, when pressures drop below 20 psi, the distribution system is more susceptible to contamination from backflow and backpressure events.

The distribution rules in §290.44, the capacity rules in §290.45, and the operation requirements in §290.46(r) and §290.47(e) all describe the pressure requirements for PWSs. §290.47(e) describes when a PWS must disinfect a low-pressure area, and/or issue a boil water notice for low pressure. PWSs must keep a record of pressure complaints per §290.46(f)(3)(A)(iii). Pressure device requirements are described in §290.43(c)(4).

Assistance:

Your PWS documentation of pressure and complaints should help you answer the questions. You can check to make sure you meet the requirements for pressure by looking at the rules in Chapter 290.

Although the regulations do not have specific frequencies and locations for required pressure measurement, a PW must be able to measure pressure in order to measure and determine compliance with the minimum pressure requirements. For example, you must be able to determine whether pressure is at an acceptable level before returning to service after a boil water notice.

CARP

If there are any issues with distribution pressure or usage, those should be described in the CARP.

If any pressure event was a concern, you must submit documentation of pressure measurements.

J.1.a. Did unusual demand occur around the time of the TC+?

If unusual demand occurred for any reason, check **'Yes.'** If it did not, check **'No.'**

J.1.b. For example, firefighting or main break?

If unusual demand occurred specifically for firefighting or main break, check **'Yes.'** If it did not, check **'No.'**

Unusual demand can cause issues such as low pressure with contaminant intrusion, or even line breaks or cracks resulting from rapid changes in pressure or water hammer.

Review any pressure data for the area surrounding the TC+ to help determine whether pressure was continuously maintained in that area. Determine whether the increased demand, pressure fluctuations or water hammer could have led to a TC+.

J.1. a & b Correction Options:

If unusual demand caused the TC+, consider how the system or operational procedures could be modified to prevent the situation in the future.

J.1. a & b TCEQ Follow-Up:

The TCEQ recognizes the need for many PWSs to provide fire flow, and will take fire-flow into consideration for low-pressure events between 20 psi and 35 psi. Keep documentation for review during future inspections.

J.1.c. Are there any persistent leaks?

Persistent leaks are a high risk because they provide a source of pathogens during low pressure spikes. If high usage occurs in a system with persistent leaks, it will cause a high risk of pathogen intrusion.

Additionally, leaks cause lost revenue that could be used for system maintenance. The TCEQ rules require limited hydrostatic [§290.44(a)(5)].

If there are no persistent leaks, check **'No.'** If so, check **'Yes.'**

Any answer of **'Unknown'** or **'N/A'** should be explained in the CARP.

J.1.c. Correction Options:

If persistent leaks present, and could lead to contamination, make repairs

J.1.c. TCEQ Follow-Up:

Consult with the TCEQ regarding any needed construction, especially if additional time is needed to make repairs. Keep documentation for review during future inspections.

J.2.a. Did the pressure drop below 35 psi anywhere?

If the pressure dropped below 35 psi, check **'Yes.'** If it did not, check **'No.'** If you do not know what the pressure was, check **'Unknown.'**

J.2.b. Did the pressure drop below 20 psi anywhere?

If the pressure dropped below 20 psi, check **'Yes.'** If it did not, check **'No.'** If you do not know what the pressure was, check **'Unknown.'**

Gather and review your records for pressure monitoring, including complaint response investigations performed. Identify areas impacted by low pressure. Consider how close low-pressure areas were to TC+ locations.

J.2a & b. Correction Options:

Review your pressure-maintenance program and determine whether operational or equipment adjustments are needed to maintain compliant pressures under all conditions

J.2a & b. TCEQ Follow-Up:

Failure to maintain pressure can cause pathogen intrusion, disinfectant decay, and pipe cracks, which may be associated with violations. Keep documentation for review during future inspections.

J.2.c. Was there an outage or did pressure drop to 0 psi anywhere?

If a water outage occurred, or you (or TCEQ) measured zero pressure, check **'Yes.'** If not, check **'No.'**

Even without pressure data, if there were times when people opened their taps and no water came out, that means that there was an outage, with a pressure of zero.

Gather customer complaints related to water outages. Review pressure and maintenance records. Identify areas impacted by water outages. Consider whether the TC+ occurred near the area of the outage, and whether it was before or after the water was returned to service.

J.2.c. Correction Options:

The PWS should make sure this does not happen again to ensure that the water system is providing continuous and adequate supply of potable water to its customers. For example, revise protocols and evaluate distribution system infrastructure to ensure outages are mitigated or significantly minimized in the future. Loss of pressure in the distribution system significantly increases the risk of contamination from backflow and backpressure events.

If you do not have complaint records that show what the pressure is after receiving a pressure complaint, start maintaining pressure records.

If you do not have a way to measure and record pressure, plan to obtain pressure measurement equipment.

J.2.c. TCEQ Follow-Up:

Failure to maintain pressure can cause pathogen intrusion, disinfectant decay, and pipe cracks, which may be associated with violations. TCEQ may consult with you regarding a water outage. An on-site investigation may be scheduled. Keep documentation for review during future inspections.

J.3. Were special precautions instituted immediately following the loss of pressure in accordance with the flowchart?

Whenever there is a loss of pressure it is a best practice to respond, and, if there is a risk, to correct it and let people know what appropriate action to take—for example, to boil water.

Depending on the nature of the event, a PWS may choose to disinfect and flush an area out of concern, even if the pressure is over 20 psi.

The TCEQ has specific requirements in §290.46(q) and §290.47(e). **The flow chart showing the procedures to follow when pressure drops below 20 psi is attached to this manual.**

If the PWS did not have a low pressure event or water outage, check **'N/A.'**

If the PWS issued a boil water notice in response to a low pressure event, check **'Yes.'** Check **'Yes'** even if the decision to issue a boil water notice was made by the PWS even though the rules did not require it.

If the PWS should have issued a boil water notice in response to a low pressure event or water outage, but did not do so, check **'No.'**

J.3. Correction Options:

Review your data and §290.47(e). If you had difficulty issuing a required boil water notice, put procedures in place to allow rapid notice to customers if another low pressure event or water outage happens.

J.3. TCEQ Follow-Up:

Failure to issue a required boil water notice is a violation. The TCEQ will consult with you regarding required boil water notices. An on-site investigation may be scheduled. Keep documentation for review during future inspections.

J.4. If the procedures in the Special Precautions Flowchart could not be followed, was a boil water notice issued to customers immediately?

Under the procedures shown in the attached flowchart, a boil water notice may be needed.

If the PWS did not have a low pressure event or water outage, check **'N/A.'**

If the PWS followed the Special Precautions Flowchart in response to a low pressure event, determined that a boil water notice was required, and issued it—check **'Yes.'**

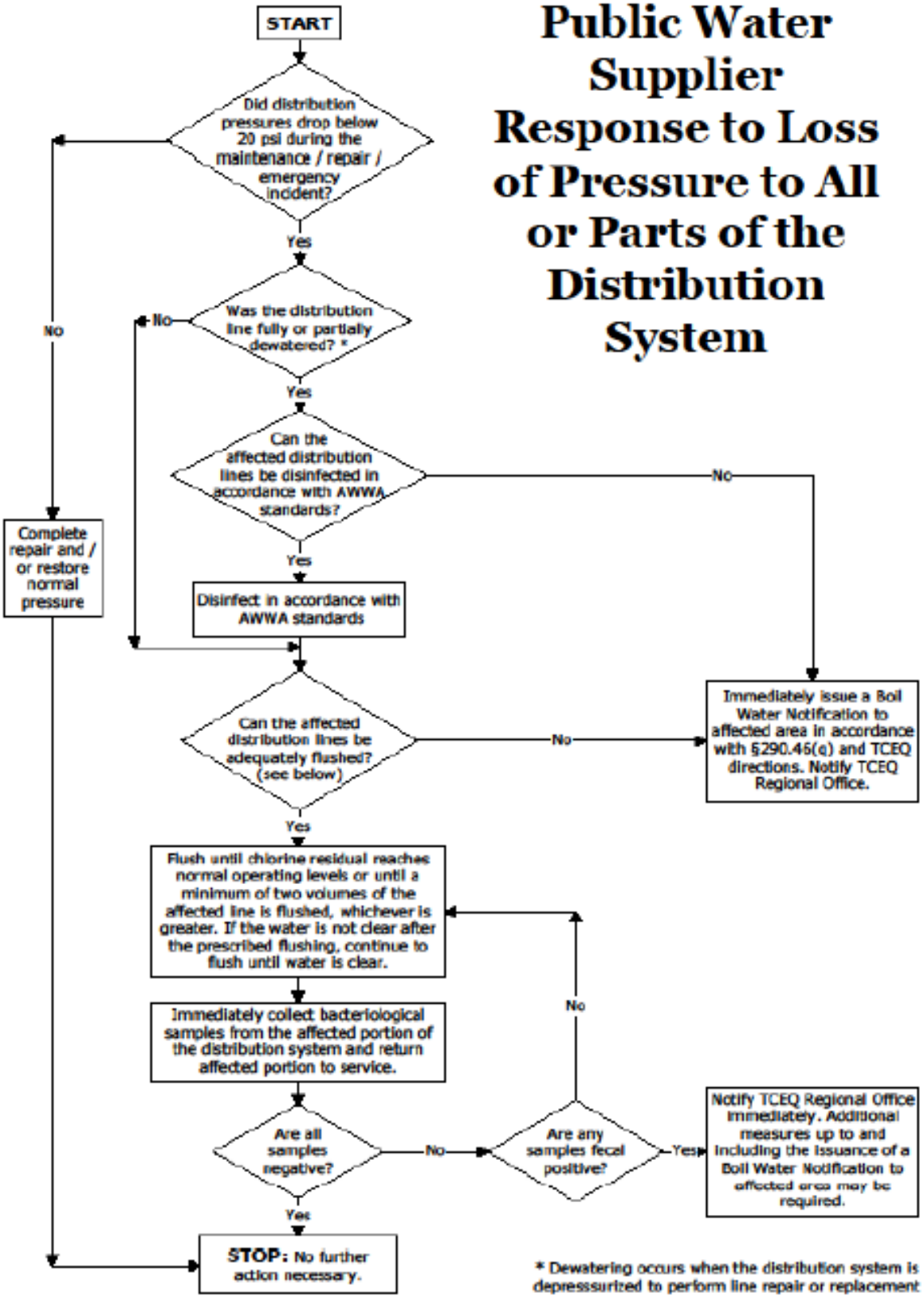
J.4. Correction Options:

Review your data and §290.47(e). Review your standard operating procedures for taking actions after repairs, construction, low-pressure events, and water outages. If you had difficulty performing the required steps, put procedures in place to allow for rapid response during any future low pressure event or water outage.

J.4. TCEQ Follow-Up:

Failure to disinfect after a low-pressure situation is a violation. It may cause future issues with residual loss or TC+ in the same area. Keep documentation for review during future inspections

30 TAC §290.47(e) Special Precautions Flowchart



Section K—Storage and Water Age

Questions:

These questions are intended to help you assess your storage tanks, and the age of the water it stores.

A **small system** with a single storage tank and/or pressure tank must assess their tanks during the Level 1 Assessment.

A **large system** with multiple storage and/or pressure tanks must assess tanks relatively near any TC+ locations. For example, they must assess tanks in the same pressure plane.

Purpose:

Storage tanks play an important role ensuring that adequate amounts of water are available for customers. However, during peak demands and fire flows they must be designed and operated correctly to prevent degradation of water quality.

Storage tanks are critical infrastructure. If tank openings are not well protected, birds or other wildlife can enter and defecate. If screens are not covering all vents, insects can enter, lay eggs, and their larvae can enter the distribution system.

In the Level 1 Assessment process, excessive water age is categorized with storage tanks—often, water age problems occur in tanks. As water ages in them, disinfectant levels degrade, bacteria can grow, and regulated disinfection byproduct levels (trihalomethanes and haloacetic acids) can increase.

Elevated storage tanks that float on the system and are designed to take on water and discharge it through the same pipe are at an increased risk of stratification. Stratification is where the cooler, denser water is on the bottom and the warmer water is located in the upper level of the storage tank.

When fresh, cooler water from the distribution system enters the storage tank, it has a tendency to stay at the bottom, and as a result it is often the first to be released, leaving the warmer layer to age and degrade.

Storage tank issues may or may not cause violations of TCEQ regulations.

Assistance:

Your PWS plans and specifications, together with sampling data from sites representing storage tanks should help you answer these questions. You can check to make sure you meet the requirements for storage tanks by looking at the rules in §290.43 and elsewhere.

CARP

If there are any issues with storage or water age, those should be described in the CARP.

K.1.a. Are all storage tanks well maintained and operational?

Review your records and compliance documentation with §290.43 and §290.46(m). If all of your storage tanks are clean, free of leaks, free of sediment, and compliant with all of TCEQ's rules, check **'Yes.'** If not, check **'No.**'

K.1.b. Have all storage tanks been inspected in the past year?

If all storage tanks have been inspected within the past year, check **'Yes.'** If not, check **'No.**'

K.1. a & b. Correction Options:

Ensure that all tanks are inspected annually in accordance with §290.46(m)(1). Schedule inspections if needed. If maintenance or operational issues are present, make corrections or repairs.

Ensure that all vents are screened, that there are no leaks, gaps, corrosion, or other issues which may lead to potential contamination. Schedule cleaning for those tanks exhibiting poor residuals or degrading water quality. Keep documentation of inspection findings and corrective actions.

K.1. a & b. TCEQ Follow-Up:

Noncompliance with the TCEQ rules for storage tanks may be identified as a violation. Be prepared to provide data to the TCEQ upon request; keep documentation for review during future inspections.

K.2.a. Are all pressure tanks maintained and operated correctly?

Review your records and compliance documentation related to §290.43(d) and §290.46(m). If all of your pressure (hydro-pneumatic) tanks are maintained well and operational, check **'Yes.'** If not, check **'No.**'

If you do not know if the pressure tank is operating well, check your pressure records and repair logs. A well operated pressure tank should hold pressure when not in use and operate consistently.

If you do not know, go look at the pressure tanks. Corroded paint, rust, and other forms of decay can be indications of poor maintenance.

K.2.b. Have pressure tank's exterior been inspected in the past year?

Review your records. If the exterior of all storage tanks have been inspected within the previous 5 years, and records of the inspections have been kept, check **'Yes.'** If not, check **'No.**'

K.2.c. Have pressure tank's interior(s) been inspected in the past 5 years?

If the inside of all pressure tanks have been inspected within the previous 5 years, check **'Yes.'** Pressure tanks over 1,000 gallons must have an inspection port. If not, check **'No.**' If an inspection port is not required, check **'N/A.'**

K.2. a, b, & c. Correction Options:

Schedule inspections if needed. If maintenance or operational issues are present, make corrections or repairs.

Perform internal and external inspections to ensure that all pressure relief valves are screened, and that there are no leaks, dry-rotted gaskets or seals corrosion, or other issues which may contribute to potential contamination.

Address any safety issues related to elevated pressure. Keep documentation of inspection findings and corrective actions.

K.2. a, b, & c. TCEQ Follow-Up:

Noncompliance with the TCEQ rules for storage tanks may be identified as a violation. Be prepared to provide data to the TCEQ upon request.

Keep documentation for review during future inspections. Specifically, keep invoices, work orders, purchase orders, correspondence, and photos before and after repair.

Ensure that new operators and office staff are instructed on what papers to keep, and where to keep them.

K.3. Have all issues found during inspections been fixed?

This question applies to both the storage tanks and pressure tanks. Review your records.

If your tanks have had all required inspections, and all issues were fixed, check **'Yes.'**

If issues found during an inspection have not yet been fixed, answer **'No.**'

If your tanks have not been inspected, check **'N/A.'**

If your tanks were inspected but no issues were found, check **'N/A.'**

K.3. Correction Options:

Have an inspection performed if needed. Fix any issues that have not yet been fixed.

K.3. TCEQ Follow-Up:

Noncompliance with the TCEQ rules for storage tanks may be identified as a violation. Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

K.4. Are all openings at most 1/16" or screened with 16-mesh or finer?

If openings larger than 1/16” are present, insects can enter tanks and cause a potential source of pathogens. The TCEQ rules describe the minimum requirements for tank openings in §290.43(c)(3).

If your tank overflow or other covers close tight and openings are covered with 16-mesh or finer corrosion-resistant screen, AND if all roof openings have proper cover with raised, overlapping curbing and are kept closed and locked check **'Yes.'** If not, check **'No.'**

K.4. Correction Options:

Repair any gaps greater than 1/16". Screen all openings with corrosion resistant 16-mesh or finer screen (for example, 18-mesh).

K.4. TCEQ Follow-Up:

Noncompliance with the TCEQ rules for storage tank screens and vents may be identified as a violation. Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

K.5. Are storage tanks designed and operated to prevent short-circuiting and excessive water age?

If tanks are incompletely mixed, they can stagnate and produce zones of inadequate disinfectant residual. This can allow regrowth of bacteria, and when usage goes up—that stagnant water can enter the distribution system and create a public health risk. Improper inlet/outlet locations leading to short-circuiting is also a violation of 290.43(c)(5).

If your storage tanks are designed and operated to minimize water age, check **'Yes.'**

If your storage tanks have any design or operation issues that cause short circuiting or high water age, check **'No.'** You can describe in more detail under the CARP.

K.5. Correction Options:

If your storage tank design causes excessive water age and short-circuiting, consider installing mixing units, re-configuring the inlet/outlet design, or adding baffling to prevent excessive water age. Additionally, you should develop and implement an SOP for practicing deep cycling of storage facilities to ensure the availability of fresh water at all times.

K.5. TCEQ Follow-Up:

Failure to maintain minimum residuals in storage tanks is a violation of §290.46(d)(2). Excessive water age may lead to violations of disinfectant residual, disinfection byproducts, and coliform rules.

Be prepared to provide data to the TCEQ upon request; keep documentation for review during future inspections.

K.6. Has low water use caused excessive water age?

If you are under drought conditions, review usage data and water quality data to determine if low water use is contributing to water age. Rainy weather conditions could also cause low water use. If so, check **'Yes.'** If not, check **'No.**'

K.6. Correction Options:

It may be necessary to increase disinfection levels leaving treatment facilities to counteract water age due to lower usage often experienced during droughts. Develop and implement flushing strategies that will give you the most benefit. Flush less at dead end lines, with historically better water quality, and re-direct those efforts to areas where degrading water quality is found. The TCEQ may have the ability to assist you in recovering from an extreme weather event. Contact the Water Supply Division at 512-239-4691.

K.6. TCEQ Follow-Up:

The TCEQ takes extreme weather events into consideration when determining compliance. During the drought of 2011-2015, TCEQ prioritized PWSs who were impacted by drought. Consult with TCEQ to find out your options.

K.7. Do flushing results indicate excessive water age? (e.g. heavy sediment)

Water stagnation can allow regrowth of bacteria, which is a potential pathway for pathogens.

Review your records for flushing, including dead-end main flushing, for the most recent two months through present. If complaints that required flushing increased recently, it may indicate a water age issue. If your data indicates that it has been taking longer than normal to reach an adequate residual, water age may be an issue. If results show difficulty maintaining residual at dead-end mains, longer flush times, or heavy sediment, check **'Yes.'**

If flush all dead-end mains monthly, and the recent results are normal, check **'No.'**

If you operate a non-traditional PWS, like an industrial site or a restaurant, check **'N/A'** and describe the situation. If you have a flushing program that addresses stagnant areas, describe that in the CARP. If not, consider where water may stagnate. For example, a long pipe that goes to a rarely used site. Best practice is to identify these locations and periodically flush them, check the residual, and remove sediment.

Any answer of **'Unknown'** must be explained in the CARP.

K.7. Correction Options:

Review your dead-end main flushing program, valve exercise program, and water loss audit. Make sure they are up-to-date and effective. Consider distribution system modifications to lessen water age. For example: looping distribution lines and eliminating dead ends. In a non-traditional PWS, identify stagnant areas—similar to dead-ends—and initiate a flushing program.

K.7. TCEQ Follow-Up:

Failure to flush dead-end mains monthly is a violation, and failure to maintain records is a violation. Consult with the TCEQ regarding any violations that are indicated on the Level 1 Assessment form.

Section L—Cross-connection, backflow, backsiphonage prevention

Questions:

These questions are intended to help you assess the risk of cross connection, backflow, and backsiphonage, and whether they may have led to a TC+.

Purpose:

The final barrier protecting customers from hazardous chemicals and waterborne pathogens in the distribution system are maintaining adequate disinfection residuals and a robust and effective Cross Connection Control Program. When contamination enters the distribution system via backpressure or backsiphonage it bypasses the more robust disinfection treatment at the treatment plant.

As a result, it puts the customers at a higher risk for waterborne illness as the water has a more direct route to customers' taps. When cross-connections occur, they significantly reduce the contact time that the disinfection has to react and inactivate or remove hazardous chemicals or microbes.

Assistance:

All PWSs periodically receive a Cross-Connection Control Program questionnaire, about every three years. The instructional material sent with that questionnaire generally describes the qualities of an adequate program.

You can check to make sure you meet the requirements for cross connection, backflow, and backsiphonage prevention by looking at the rules in §290.41, §290.44 and §290.46.

The TCEQ also has RG 478 "**ESTABLISHING AND MANAGING AN EFFECTIVE CROSS-CONNECTION CONTROL PROGRAM**" and RG-206 "**A PUBLIC WATER SYSTEM GUIDE TO CUSTOMER SERVICE INSPECTIONS**."

CARP

If there are any issues with coliform sampling, those should be described in the CARP.

L.1.a. Is there adequate backflow prevention at PWS interconnections?

If the PWS has no interconnections with other PWSs, answer **'N/A.'**

If the PWS is interconnected to any other PWS, and if each interconnection is protected with an airgap or backflow prevention device answer **'Yes.'** If the PWS is interconnected to any other PWS, and the interconnection is not protected from backflow, check **'No.'**

L.1.b. If so, has it been inspected in the last 12 months?

If the PWS has no interconnections with other PWSs, answer **'N/A.'**

If the PWS has backflow control which has been inspected or tested in the last 12 months, check **'Yes.'** If backflow control is present, but has not been tested or inspected, check **'No.'**

Note that, although an air gap cannot be tested, it can be inspected. An air gap can become non-functioning in various ways, including insect or rodent infestation. The adequacy of an air gap should be documented through photographs and a written report of observations.

L.1. a & b. Correction Options:

If you don't have a testable backflow prevention device or an inspectable air gap at the connection between you and your wholesaler, install one.

If you have a backflow device and it is not current on inspection, ensure that you have an individual that is "BPAT" certified come out and calibrate it.

If an air gap is present, inspect it to determine whether it meets the minimum standards for air gaps described in the USC Manual of Cross-Connection Control.

L.1. a & b. TCEQ Follow-Up:

Backflow protection is very important in ensuring that contaminants do not enter your distribution system from illegal or inappropriate connections.

Maintain a record of all of the backflow prevention devices in your system as well as all the test and calibration results for review by the TCEQ.

L.2. Do any cross-connections exist in the chemical feed facilities?

Review your chemical feed piping and compliance documentation—if any cross-connections exist, check **'Yes.'** If none exist, check **'No.'**

L.2. Correction Options:

Re-configure chemical feed piping and chemical makeup water to ensure that no cross connections are present that could allow chemicals or untreated water to enter the distribution system. Backpressure and backsiphonage are pathways which can allow harmful chemicals or pathogens to enter the distribution essentially untreated. This is a significant concern regarding the health and safety of the public and should be treated as the highest of priorities.

L.2. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.3.a. Does the PWS have a service agreement with all customers?

Review your records. If you serve fewer than 5,000 people and/or are not a municipality, do you implement a Service Agreement with each customer?

If you have a customer service agreement with each customer, check **'Yes.'**

If instead of a customer service agreement, has the PWS implemented the plumbing code through a municipal ordinance, select **'No.'**

L.3.b. Or, does the PWS have a plumbing ordinance?

If you are a municipality and serve more than 5,000 people, and you have a plumbing ordinance that is implemented through the City, Utility, or PWS, select **'Yes.'**

If you do not have an ordinance, check **'No.'**

L.3 a & b. Correction Options:

Ensure that your PWS has a Service Agreement that complies with §290.47 and—if required—a plumbing ordinance. Ensure that Customer Service Inspections are performed periodically, for example when industrial building usage changes.

Ensure that any code enforcement staff are trained in identifying hazards and that CSIs are performed by licensed inspectors.

L.3 a & b. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.4.a. Is appropriate backflow prevention present at all connections with potential hazards?

A successful Cross-Connection Control Program includes oversight of hazards in the PWS's service area. For example, some cities review business records for the area and periodically contact those that may have hazards, and/or review the need for backflow prevention at the time a certificate of occupancy is issued. Other PWSs may have other strategies.

Appropriate backflow prevention methods depend on the hazard that they are protecting against, and where they are installed. There are many varieties of backflow prevention—some types include:

- Reduced-pressure principle backflow preventer,
- Check valve,
- Air gap.

If your PWS ensures appropriate backflow prevention is present and documents that with inspections to verify that devices are functional, etc., select **'Yes.'**

If you do not, check **'No.'**

If you believe that this requirement does not apply to your PWS, select **'N/A'** and describe your reasoning in the CARP.

If you are not able to determine an answer, select **'Unknown'** and explain why in the CARP.

L.4.a. Correction Options:

Ensure that your PWS has backflow preventers installed and functional at connections with hazards. Have a program to make sure that backflow preventers are tested annually where needed. Perform internal and external outreach to educate PWS staff and customers on the importance on backflow preventer testing and maintenance. Keep records of locations of hazards and their backflow prevention strategy.

L.4.a. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.4.b. Do any customers have private wells or rain water collection systems?

One frequent way that distribution systems are contaminated is by homes with private wells or rainwater collection systems.

Homes that have private wells may have had those wells drilled decades ago, and the wells were not drilled to stringent PWS standards. Also, the water is usually not disinfected. Therefore, those private wells are highly likely to contain pathogens. When a house has water coming from both a private well and the PWS, any decrease in distribution pressure can suck that well water in and contaminate the distribution system.

Rain water collection is more popular in Texas since the recent drought. Rain water is essentially surface water; it contains pathogens from the roof, which is open to animal feces, particularly birds. Therefore, if a home has both rain water collection and a connection with the PWS, the PWS is at risk of potential contamination.

If you are sure there are no customers with private wells or rain water collection in the area of the assessment, select **'No.'**

If there are connections with private wells or rain water collection, check **'Yes.'**

If you believe that this requirement does not apply to your PWS, select **'N/A'** and describe your reasoning in the CARP.

If you are not able to determine an answer, select **'Unknown'** and explain why in the CARP.

L.4.b. Correction Options:

If any connections in the area have a private well or rain water collection system ensure backflow preventers are installed and functional.

L.4.b. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.4.c.Do any customers have both a septic system and lawn irrigation?

When septic systems and irrigation systems are located in the same vicinity, a high risk of cross connection is present. The PWS should ensure that the distribution system is protected and also provide outreach to the customer about the internal risk.

If you are sure there are no customers septic and irrigation in the area of the assessment, select **'No.'**

If there are connections that have both septic and irrigation, check **'Yes.'**

If you believe that this requirement does not apply to your PWS, select **'N/A'** and describe your reasoning in the CARP.

If you are not able to determine an answer, select **'Unknown'** and explain why in the CARP.

L.4.b. Correction Options:

If any connections in the area have a private well or rain water collection system ensure backflow preventers are installed and functional.

L.4.b. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.5. Was distribution water impacted by a backflow event?

A backflow event includes:

- Cross-connection,
- Backsiphonage,
- Backflow,
- Intrusion, and/or
- Any other situation where non-potable water contaminates potable water.

Review the map of your distribution system. Consider hazards that might be present in the area of where the TC+ occurred. Check the area to see if conditions favorable to cross connection, backflow, or backsiphonage could have happened (low pressure, water outages, etc.). If this review identifies an incident, check **'Yes.'** If not, check **'No.'**

L.5. Correction Options:

If a cross contamination event occurred, respond appropriately with disinfection, flushing, and requirements for backflow devices and/or internal programs where appropriate.

You should also consider implementing a GIS program that includes high hazard testable backflow devices. Knowing where these devices are in your system will assist you when

performing assessments. Having these locations annotated on a map is invaluable when developing action plans and troubleshooting your system.

L.5. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.6. Did a failure of a backflow prevention assembly cause backflow?

Review your records for sites with TC+. Do any potential health hazards exist? Did a backflow prevention assembly fail, allowing contamination to enter the distribution system? If so, check **'Yes.'** If not, check **'No.'**

L.6. Correction Options:

If yes, are backflow prevention assemblies tested at the appropriate frequency? Documentation you will need to keep includes Backflow Prevention Assembly Testing (BPAT) reports.

Correction option: If the failure of a backflow prevention assembly caused backflow, ensure that in the future all backflow prevention assemblies are tested at least annually. In addition, make sure the appropriate type of backflow prevention assembly is in use.

Make sure that testing is annual if hazards are present. Use Customer Service Inspections to identify potential hazards.

You should also consider implementing a GIS program that includes high hazard testable backflow devices. Knowing where these devices are in your system will assist you when performing assessments. Having these locations annotated on a map is invaluable when developing action plans and troubleshooting your system.

L.6. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

L.7. Was a Customer Service Inspection performed at active service connections where a TC+ occurred?

Did the PWS perform a Customer Service Inspection at sites with TC+ to identify any potential pathways for pathogen contamination? If so, check **'Yes.'** If not, check **'No.'**

L.7. Correction Options:

A Customer Service Inspection is a useful process for identifying hazards that could cause degradation of distribution water quality.

L.7. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

Section M—Security

Questions:

These questions are intended to help you assess whether your security procedures will help protect against vandalism or other security threats.

Every PWS has a responsibility to provide continuous and adequate water to their customers, which means preparing for potential security issues. Therefore, securing the facilities ensures that the public will not lose water to a security issue or other emergency event.

Security issues may or may not also be violations of TCEQ regulations.

Assistance:

Your PWS documentation of security programs should help you answer the questions. You can review the requirements in Chapter 290 Subchapter D.

CARP

If there are any issues with security, those should be described in the CARP.

M.1. Did any security breaches or vandalism occur?

Review your records to determine if any incidents occurred. For example, a break-in at an elevated storage tank. If there was an incident, check **'Yes.'** If not, check **'No.'**

M.1. Correction Options:

Ensure vandalism warning signs are posted at every well site and water treatment facility.

M.1. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

M.2. Does the system have an emergency response plan?

If you have an emergency response plan, regardless of whether it is required, check **'Yes.'** If not, check **'No.'**

M.2. Correction Options:

An emergency response plan is a useful tool to address and correct security vulnerabilities when identified. Ensure vandalism warning signs are posted at every well site and water treatment facility.

M.2. TCEQ Follow-Up:

Be prepared to provide data to TCEQ upon request; keep documentation for review during future inspections.

Section N—Sanitary Defects

Questions:

This section asks the fundamental question: Were you able to find the potential reason that you had a TC+? Those bacteria had to come from somewhere—or be growing somewhere.

A sanitary defect is defined as a pathway or situation that could allow pathogens to enter the potable water in the distribution system.

A sanitary defect may or may not also be a violation of the TCEQ regulations.

There are no "right" answers. It is what it is.

In this section you are just reporting on what you found and clarifying whether the things you did find were or related to the TC+, or not.

N.1. Did you find any sanitary defects?

If you found a situation or process that could have caused a pathway for pathogens to enter your distribution system, answer **'Yes,'** even if you do not think THAT sanitary defect caused the TC+.

N.1. TCEQ Follow-Up:

TCEQ will follow-up on all sanitary defects. Keep the letters that you receive, to provide during any inspection.

N.2. Did a sanitary defect that you found cause the TC+(s)?

This is where you report **'Yes'** if you found a connection between a sanitary defect and the TC+.

For example—if a main break happened near where you found a TC+, it is likely that some water from the trench could have got in the pipe and caused the TC+. However, if the main break was miles away—it is not as likely.

N.2. TCEQ Follow-Up:

Depending on the type of sanitary defect, TCEQ follow-up will vary.

For example, if a sanitary defect was related to monitoring or reporting, you would likely be contacted by the TCEQ's Water Supply Division,

Or, as another example, if the sanitary defect was related to low residual or low pressure, you might be contacted by your TCEQ Regional Office.

N.3. Did you fix or correct a sanitary defect (partially or completely)?

Answer **'Yes'** if you were able to get the sanitary defect fixed within 30 days of triggering it. Also, attach documentation of any corrective action(s) taken.

For example—if you were able to get a main break fixed in that 30 day window, that's a **'Yes.'** You would attach the work order and receipts related to fixing it.

N.4. TCEQ Follow-Up:

TCEQ staff will review the documentation when it is received. Keep a copy of the documentation and ensure it is available for review during any future inspection.

N.4. Do you need more time to fix a sanitary defect in the future?

Answer **'Yes'** if you need more time to get the sanitary defect fixed. You need to request the extension from TCEQ at 512-239-4691 and provide documentation describing the nature and details of your plans to TCEQ.

For example—if you have hired a contractor to do work, but they are not immediately available, you need to document that with work orders, correspondence, contracts, or other documentation.

N.4. TCEQ Follow-Up:

If you need more time to fix a sanitary defect, you can request additional time from the TCEQ. If you check 'Yes' that you have plans to fix something, you should also call the TCEQ Water Supply Division staff at 512-239-4961 to ensure that you request that additional time.

Corrective Action Report and Plan (CARP)

The form instructs you to "Report on any issues that you found and fixed." If the issue is not yet fixed, attach your plan to correct it and request time to fix it. Attach additional sheets if needed.

If you have more than one issue that you found and fixed, add additional pages. The form includes a blank page that you can use.

Report

Issue description:

This is where you report on what you found. Describe what happened, where, when, and how.

If you found a problem, describe that. Then, describe what you did to fix it under "Corrective Action."

If you believe an issue caused a TC+, explain why.

Report on issues or sanitary defects you found, even if you do not think that the specific issue led to a TC+ in this case.

Section Letter & Question Number:

Write the number of the question that the issue is related to. For example, if you had an issue related to the coliform sample collection SOP, write "B.2." because question B.2. asks about that.

Corrective Action

This is where you report on what you fixed—or what you plan to fix.

If you fixed something, report on the 'fix' even if you do not think that the thing you fixed was directly responsible for a TC+.

If the corrective action involved updating your monitoring plan, an SOP, or other documents, and attach a copy of the updated version. Describe the changes you made here.

If the corrective action you made was visible (like screening a vent), take before-and-after photos and attach those to the submittal.

Status of Corrective Action

If you have completely fixed a problem, select 'Complete.' If you need more time, check that option and attach the FAST and contact the TCEQ.

Plan

If you find a sanitary defect that will require more than 30 days to fix, you may request additional time from the TCEQ. However, TCEQ will only consider an extension if you submit a fully-documented FAST.

Financial Assurance Statement and Timeline (FAST)

If additional time is needed to fix things, request that additional time from TCEQ by providing and Financial Assurance Statement and Timeline (FAST), describing:

- ***The general scope of the project.***
    - For example "Replace ground storage tank destroyed by Halloween floods."
    - Or "Hire licensed operator."
- ***The expected cost.***
    - A ballpark estimate is adequate, but part of the follow up requirement will be a more detailed estimate.
- ***How the project will be paid for.***
    - If funds are available, state that. If funds are not immediately available, describe how they will be sought.
- ***A timeline.***
    - Provide a timeline for engineering, approval, bidding, construction, training, and any other needed actions.

If the extension is approved, the TCEQ will require periodic follow-up progress reports, for example—monthly.

If an extension is provided, the PWS must meet the TCEQ-approved corrective action timeline, or risk a violation.

Even if a PWS requests an extension, the Level 1 Assessment form with the request is due to the TCEQ in **30 days**; failure to submit it is a violation.